Networks before Empires: cultural transfers in west and central Anatolia during the Early Bronze Age

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Declaration

I, Michele Massa, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Abstract

This dissertation offers an analysis of social interaction in west and central Anatolia during the Early Bronze Age (EBA, c.3200-1950 BC). It aims at identifying potential rationales for and mechanisms of exchange from the intra-settlement to the interregional scale, within the context of growing socio-economic and political complexity experienced by the local communities across the EBA. Through distributional and contextual analysis of a large range of case studies, this dissertation explores how different products, raw materials, technological knowledge and cultural behaviours circulated within Anatolia, and does so both by mapping likely flows of goods and ideas and by analysing the context of artefact use and deposition. It also investigates how increasing degrees of organization affected patterns of exchange, both at the production (specialisation, scale and intensity of production) and the circulation stages (presence of specialised exchange intermediaries, innovations in transport technology, investment in road infrastructure, control over routes). This research further attempts to reconstruct the structure of physical and social networks in EBA Anatolia, looking at how topographic and cultural constraints funnelled movement (and hence interaction) along specific landscape corridors. Lastly, it explores the role played by rising local elites and the importance of Anatolia’s vast metal resources in the process of expansion of long-distance exchange networks, which ultimately allowed the integration of Anatolia within the Near Eastern and Aegean worlds towards the end of the EBA.

I met a traveller from an antique land

Who said: Two vast and trunkless legs of stone

Stand in the desert. Near them on the sand,

Half sunk, a shatter'd visage lies, whose frown

And wrinkled lip and sneer of cold command

Tell that its sculptor well those passions read

Which yet survive, stamp'd on these lifeless things,

The hand that mock'd them and the heart that fed.

And on the pedestal those words appear:

"My name is Ozymandias, king of kings:

Look on my works, ye Mighty, and despair!"

Nothing beside remains: round the decay

Of that colossal wreck, boundless and bare,

The lone and level sands stretch far away.

Percy Bysshe Shelley

Table of contents

Volume 1

Volume 2

List of figures

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Chapter 1: Introduction

The Early Bronze Age (c.3200-1950 BC, EBA henceforward) of west and central Anatolia (modern Turkey) marks a turning point in the prehistory of the region, with the establishment of the earliest stratified societies in the area documented by the appearance of formalised public buildings, the widespread occurrence of differentiated funerary ceremonies and the exponential growth of the main settled centres. Contemporary with these developments, we can observe larger-scale exploitation of natural resources (e.g. vast metal deposits in the uplands) and an overall increase in craft specialisation, partly connected with the rapid expansion of interlocking exchange networks that see the circulation of a conspicuous range of products and ideas. These regional developments seem to be intertwined with broader processes affecting the whole Near East and eastern Mediterranean around the same time (cf. Bachhuber 2015; Broodbank 2013:257-344; Rahmstorf 2010a; Sherratt A 1993; Wilkinson 2014b). During the 3rd millennium, participation in these interregional networks brings Anatolia into direct contact with the Mesopotamian world, thereby providing a document-poor but increasingly obvious precursor to the better-understood integration of Middle and Late Bronze Age Anatolian kingdoms into the arena of Near Eastern politics.

Despite its perceived importance at the regional and interregional level, and notwithstanding the large number of projects, the wealth of archaeological finds and the numerous parallels in material culture to be found in surrounding regions, the Anatolian EBA is, still today, rarely addressed in detail by scholars working in eastern Mediterranean, Balkans and Near East. The marginal position of Anatolia in western scholarship is reflected by the enduring metaphor of Turkey as a bridge, a region that exists only as an entity between two (as academic tradition would have it) more focused poles of research, the Aegean and Mesopotamia (Bachhuber 2015:12). Until ten years ago, for instance, the prehistoric Aegean was mostly conceived as ending immediately east of Crete and the Cyclades (e.g. Cherry et al.2005), an idea that still permeates most of the research carried out in the area, even though recent publications have started to integrate scholarship from both sides of the basin (cf. Broodbank 2000, 2013; Erkanal et al.2008; Kouka 2009, 2013; Şahoğlu 2005; Şahoğlu and Sotirakopoulou 2011). At the other end of the study area, there is a tendency to include central Anatolia within the Near Eastern world only from the Assyrian Colony period onwards, leaving aside the 3rd millennium despite numerous works stressing the strong affinities in the material culture between both sides of the Antitaurus mountains (Efe 2007; Rahmstorf 2006b, 2010a, 2010b; Şahoğlu 2005; Tonussi 2007).

At least in part, this indifference is connected with the challenges facing non-specialists in accessing primary sources (often in Turkish) and with, until very recently, a scarcity of synthetic overviews on the Anatolian EBA (but see now Bachhuber 2015; Düring 2011b:257-299; Fidan et al.2015; Sagona and Zimanski 2009:144-224; cf. in particular Bachhuber 2015:7-20 and Düring 2011b:21-30 for a detailed historiography of prehistoric Anatolian archaeology). Traditionally, within the Anatolian archaeological milieu there has also been a lack of interest in constructing broad explanatory models that might chime with research performed in surrounding areas. As Christoph Bachhuber recently observed, Anatolian EBA archaeology is a field still dominated by a cultural-historical approach that emphasises classificatory studies at the expense of theoretical modelling, in this sense not dissimilar from many other archaeologies outside US and Europe (2008:2-4).

Between the late 1970s and the early 2000s, the seminal work of Manfred Korfmann at Demircihöyük, Beşik-Yassıtepe, Kumtepe and Troy has played a fundamental role in introducing systematic, standardized methodologies of excavation, documentation, analysis and publication in the field of prehistoric Anatolian archaeology. He further promoted the integration of traditional archaeological approaches with sister disciplines and with the collaboration with a large number of specialists including geologists, landscape analysits, surveyors, chemists, architects, archaeo-metallurgists, cultural heritage managers, zooarchaeologits, palaeobotanists among others (Aslan et al. 2002; Korfmann 1983, 1987, 2006; Wagner et al. 2003; cf. also the over 20 issues of the Studia Troica journal). Particularly over the last decade, these efforts have been reflected in gradual changes in how archaeology is practised in Anatolian research. Interests have now shifted to a more comprehensive and holistic approach, with the first conscious and systematic attempts to organise this vast array of regional knowledge into tighter theoretical and methodological frameworks. This is witnessed by synthetic works on the analysis of social complexity (Bachhuber 2009; Çevik 2007; Özdoğan 2011; Schoop 2011b; Zimmermann 2009), funerary customs (Massa 2014b; Massa and Şahoğlu 2011, in prep; Perello 2013; Uhri 2010), architecture (Chabot-Aslan 2003; Fidan 2012; Perello 2011), long distance exchanges with Upper Mesopotamia and the Aegean (Beaujard 2011; Efe 2002, 2007; Rahmstorf 2006b, 2011a; Şahoğlu 2005; Tonussi 2007), metallurgical production (Begemann et al. 2003; Pernicka et al. 2003; Wagner and Öztunalı 2000; Yalçın 2000a, 2002, 2005, 2008a, 2013; Yener 2000) and environmental dynamics (Massa and Şahoğlu 2015; Riehl and Marinova 2008; Roberts et al.2011a, 2011b) among others. The clustering of these works within the last five or six years suggests that research on the subject is reaching critical mass. This is a welcome development not only because it provides the necessary background for the analyses presented in the following chapters, but also because it signals a raised interest for EBA Anatolia, to which my own research can hopefully contribute.

1.1 Research questions and analytical strategies

In the light of these traditional challenges in Anatolian EBA archaeology, but mindful of a new more promising phase, the goal of this dissertation is to create a more refined understanding of the EBA phenomenon in west and central Anatolia and its role in the wider eastern Mediterranean region, employing the concept of interaction as a lens with which to investigate the social, cultural and economic fabric of the Anatolian communities living in the 3rd millennium. As a research project, it sets out with two main research questions:

1) What were the technological context and landscape context for human interaction in Anatolia during the EBA? What were the available methods of transport, and what are the implications for their use in different contexts? What would have been the impact of landscape topography and human geography on EBA movement? How did major topographic barriers (or lack thereof) affect the persistence of specific exchange networks within a given region and across time? Were there any formalised roads or established routes in this period and, if so, which was their approximate course? How long would it have taken a traveller to go from place A to place B? What were the likely prerequisites to attempt journeys longer than a few days?

2) What are the possible social, political and economic mechanisms regulating interaction among EBA Anatolian communities? How would interaction have worked at different spatial and social scales? What sort of products and ideas circulated, and in which socio-economic contexts? Can we detect different sets of transmission patterns for different classes of artefacts/episodes of cultural transfer? What was the degree of specialisation in production and exchange attained by EBA Anatolian communities? What were the likely reasons behind the expansion and consolidation of regional and interregional exchange networks in this period? How did different exchange networks develop through time?

In order to provide tentative answers to these questions, I have chosen case studies that facilitate analysis of interaction between different groups, pertaining to different spheres of human activity (from daily routines to specific ceremonial acts to wider public life), at different spatial scales, and across different phases of the EBA. A strong emphasis is placed on cataloguing spatial distributions of multiple artefact classes as exhaustively as possible, and thereby exploring material flows across the area. The chapters that follow likewise seek to identify the origin of key artefact types and technologies, the directionality of movement, and the intensity of detectable interaction. Spatial analysis (via GIS-led methods) in particular supplies an opportunity to explore the relationship between human communities and environment, particularly with regard to the influence of the landscape on patterns of interaction. Additionally, to offer a broader understanding of the possible socio-economic drivers for exchange, I have spent a large portion of this research in reconstructing the archaeological contexts in which objects, technologies and cultural behaviours were embedded. Lastly, since the analyses presented here are based exclusively on published assemblages (covering c.130 years of research), the dataset remains very heterogeneous, in terms of documentation strategies, excavation techniques, attention to specific topics, and ability to contextualise the finds in the broader context of EBA Anatolia. In order to understand what could be analysed, what analytical tools could be employed, and how data could be compared, I have therefore attempted a general data quality assessment later in this chapter (section 1.7), which can be used as a foil for understanding the impact of data limitations upon the results presented in later chapters.

1.2 The structure of this doctoral dissertation

The remaining part of chapter 1 is dedicated to providing background for the analysis that follows. It offers a description of the study area and the natural landscapes of Anatolia, an assessment of EBA chronology, a synthetic overview of what are considered the major socio-economic dynamics of the EBA, and a characterisation of the overall archaeological record for this period and region, including its limitations. Chapter 2 explores what conceptual frameworks we might adopt and adapt for the study of interaction within the context of EBA Anatolia. It focuses on how to investigate the structure of exchange networks, the organisational complexity behind them, the possible reasons behind the circulation of products and ideas, and the relationship between social networks and landscapes. It further proposes a framework with which to integrate the analysis of interaction at different spatial scales and across time.

Chapter 3 tackles issues of movement across the EBA cultural landscape, looking into available transport technologies and possible environmental or cultural constraints on travel in order to sketch some of the main sea and land routes active in 3rd millennium Anatolia. Chapters 4 through 7 represent the analytical core of the dissertation, offering a number of case studies that explore interaction at increasingly large scales (from the intra-settlement to the interregional level) and comparing, whenever feasible, the EBA exchange networks with those of the preceding Late Chalcolithic and the following Middle Bronze Age. As a deliberate counter-point to the dissertation's otherwise very broad scope, chapter 4 begins by considering in detail possible dynamics of interaction within two small, but unusually well-documented EBA Anatolian communities, Demircihöyük and Karataş. It does so by mapping individual artefacts and human activities within each site, and analysing evidence for social differentiation in both settlement and funerary contexts. It further investigates possible forms of interaction with their surrounding environment and neighbouring settlements, and how Anatolia-wide socio-political dynamics may have affected these two communities' inhabitants. Chapter 5 then builds on the small scale lessons of its predecessor but confronts three episodes of large-scale knowledge transfer between Anatolia and surrounding regions: namely the adoption of metrology, sealing practices and the potter's wheel. It attempts to map the origin of these technologies and sketch different phases of their diffusion across Anatolia and the Aegean. It also aims at understanding the process of adaptation they underwent at a local level, focusing on the analysis of the socio-economic contexts in which the knowledge transfers occurred. Chapter 6 employs a similar analytical framework to investigate the circulation of Anatolian obsidian and metals at the regional and interregional level, whilst also giving wider attention to the neighbouring regions of Aegean and Upper Mesopotamia. It does so by comprehensively mapping the known sources of raw materials and employing artefact typology, chemical composition analysis and provenance analysis to sketch the intensity and extent of EBA exchange networks across the area. It also attempts to understand the level of organisational complexity behind extraction, refinement and circulation of raw materials. Chapter 7 casts the net wider to address the circulation of a large range of artefacts looking at their possible origin, their distribution across the region, and various episodes of local imitation or re-elaboration. Alongside the findings from previous chapters, it thereby aims to shed light on two different but complementary processes: on the one hand, to define the nature of those interregional networks that linked Anatolia with the Caucasus, Balkans, Aegean, Levant and Upper Mesopotamia. On the other hand, it also tries to understand regional networks within Anatolia, and how they were shaped by landscape amongst other constraints. Chapter 8 provides a synthetic reading of the analyses carried out in previous chapters, while a short final chapter 9 offers some final comments and considerations for future research.

1.3 The study area

As with any other academic project, this doctoral research benefits from being assigned some precise geographical borders that delimit the data to be collected and the scope of the analysis. In choosing my study area, I have tried as far as possible to have its boundaries encompass a region with a high degree of internal homogeneity both in geographical and cultural terms. Even though a significant portion of this research is devoted to proving the existence of strong contacts between west-central Anatolia and adjacent regions, during its later prehistory the Anatolian area experienced a common cultural trajectory that can be clearly distinguished from that of Upper Mesopotamian, eastern Anatolian, Circumpontic and Aegean societies (Düring 2011b:4-6; Sarı 2011:42). Arguably, this is in part due to the presence of the sea and the formidable ranges of the Taurus, Antitaurus and Pontic Mountains that acted as "persistent cultural frontiers" (section 2.1.2.2 for the concept) throughout the history of the region. Therefore, the core study area encompasses the Anatolian peninsula, a landmass surrounded on three sides by sea and separated from the rest of the Near East by high mountains (fig.1.1). The southern boundary is represented by the Mediterranean coast that, with the exception of the Antalya plain, is also bordered by high mountains and is almost completely devoid of offshore islands. While Cyprus is easily reachable, and indeed experienced a phase of intense contacts with the southern Anatolian coast during the late EBA, it arguably maintained a distinct insular identity throughout its prehistory. The south-eastern boundary with Cilicia is well defined by the Taurus Mountains, while the eastern boundary is somewhat more blurry but roughly follows the arc of the Antitaurus Mountains until they meet with the Pontic Mountains. The Black Sea coast, completely devoid of sizeable islands, constitutes a sharper boundary in the north. The Marmara Sea represents Anatolian's north-west boundary. Despite the strong north-east-south-west currents and winds, it could have been easily crossed even on rudimentary vessels (both the Bosphorus and Dardanelles Straits are on average 1-1.5km in width), but this notwithstanding there is compelling archaeological evidence that eastern Thrace was an integral part of the Balkan world until the late EBA (section 7.2.2.1). The Aegean seaboard is certainly the most porous of these boundaries, with a large number of islands that provided natural stepping points for movement and interaction between the two shores of the basin. The eastern Aegean islands (i.e. Lemnos, Lesbos, Imbros/Gökçeada, Tenedos/Bozcaada, Chios and Samos) reflect a cultural assemblage closer to coastal Anatolian sites than sites further west, and have been included in the core research area. Of course, given the fuzziness of both environmental and cultural boundaries in the real world, the result is only an approximation, and I am aware that these borders are largely artificial because human activities are rarely, if ever, so sharply constricted.

The Anatolian peninsula spans some 450,000km^2 and exhibits a high degree of ruggedness and over a third of its landscape is above 10-12 degrees of slope, which is an approximate threshold above which plough-driven intensive agriculture is difficult without terracing (Bevan et al. 2003:220-222). Four main morphological classes can be identified: coastal areas, highlands, mountains and plateaus (fig.1.2). In particular, the coastal plains are in most cases represented by narrow strips of land that would have been even smaller in the EBA, as ascertained by several geoarchaeological studies (fig.1.3). This suggests that often land movement near the shore would have been difficult for long-distance journeys, and that boats would have been the preferred medium of interaction among coastal communities, especially in the Aegean where a myriad of small islands facilitated sea-crossing. Further, high cliffs often rise immediately beyond the coast and would have severely hampered interaction between the coast and the interior. On the other hand, the western Anatolian highlands north of the Büyük Menderes river are much more permeable to human traffic: they have an average lower elevation, they only gradually rise in altitude towards the east, and are further cut by three main rivers (Küçük

Menderes, Büyük Menderes and Gediz), whose wide valleys would have allowed easy movement inland in an east-west direction. Further inland, the Taurus, Antitaurus and Pontic Mountains represent almost uninterrupted orographic chains up to 2,500-3,500m in elevation, whose rough terrain, sparse human settlement and challenging climate would have represented a significant obstacle to human movement. Significantly, however, these ranges also host some of the largest metal deposits in Anatolia, and particularly those exploited during the EBA such as copper, silver, gold and tin (figs.6.12-15). Lastly, the central Anatolian plateau is the largest relatively flat region in the study area (encompassing over 200,000km^2), with average elevations between 900 and 1,200m west of the Kızılırmak and between 1,000 and 1,500m east of the river. Furthermore, it seems important to point out that rainfall regimes, major climatic regions and main vegetation classes in western and central Anatolia (as understood from modern data) seem to roughly correspond to the basic geomorphological units identified above (figs.1.4 and 1.5, cf. Türkeş 1996; van Zeist and Bottema 1991). This point will be raised in later discussions on the connection between natural landscapes and cultural dynamics (cf. in particular sections 2.2, 8.1).

Figure 1.6 provides a map with the location of the main geo-cultural areas discussed in the text, as they emerge from the large corpus of extant research on EBA Anatolia and from my own work, while figures 1.7-1.9 plot all EBA Anatolian sites employed in the analysis and provide a summary view of known excavated sites in this period.

1.4 The relative and absolute chronology of the Anatolian Early Bronze Age

While it would require a full doctoral research to independently re-analyse over 70 years of chrono-typological pottery studies, the issue of relative versus absolute chronology needs to be addressed here in some detail since this dissertation places a lot of emphasis on the date of archaeological contexts. Anatolian EBA chronology is a field still fraught with problems of low density investigation in many areas, and a scarcity of researchers actively involved into creating broader frameworks of reference at the regional and interregional level. The ongoing ARCANE project (Erkanal and Şahoğlu in prep.) will no doubt contribute substantially to improve our understanding of pottery sequences in EBA west and central Anatolia, but it has not so far been published.

1.4.1 Analytical limitations

The nature of the EBA in Anatolia as a cultural horizon has rarely been tackled in the academic literature, and the scarcity of excavated 4th millennium sites makes it difficult to compare this phase with the preceding Late Chalcolithic. To this day, there is no agreement on the approximate chronological span of the EBA phenomenon and different authors put its beginning between 3500 and 2900 BC and its end between 2200 and 1950 BC (Üncü 2010:4-6). One of the reasons is that the EBA has been conceived until very recently (but cf. Bachhuber 2015; Sarı 2011) via a "punctiform" approach based on pottery changes at individual sites rather than via any comparative, multivariate assessment of a wider array of evidence such as social changes, economic changes, and changes in other aspects of material culture (e.g. architecture, funerary customs, ritual behaviour, artefact forms). In addition, site subphasing is still force-fitted into a traditional and largely artificial tripartite division (EB I-II-III) that bears little reflection on real developments at the local, regional and interregional scale (Bachhuber 2008:22). To complicate matters, the absolute dating and terminology of the tripartite system varies between the western coast (linked to the western Aegean chronology), inland western Anatolia (linked to the Trojan sequence) and the Kızılırmak bend (linked to the old Alacahöyük and Alişar Höyük Chalcolithic/Copper Age/Early Bronze Age partitions). On top of this, most specialist studies work on the assumption that developments in pottery manufacture are roughly contemporary across the whole area. This is clearly disprovable in the case of wheelmade pottery (section 5.3), and is probably even more so for earlier periods when pottery traditions are more localised and interregional interaction is more limited.

This difficulty in piecing together regional chronologies is also due to the scarcity of "stratigraphic pillars", i.e. sites that a) have been excavated extensively and with stratigraphic techniques, b) have been documented and published well enough to reconstruct material assemblages from closed contexts thereby allowing independent assessment, and c) cover a sufficient time span to allow for comparison with nearby sites across time (fig.1.10). It is somewhat troubling that the sites matching these criteria are all concentrated in western Anatolia and, with the notable exception of Küllüoba, most were excavated in the 1920s and 1930s (Troy, Gözlükule, Thermi, Emporio, Poliochni and Heraion), or in the 1960s and 1970s (Demircihöyük, Karataş and Beycesultan). While a fairly solid relative chronology based on site pottery sequences can been established for the western Anatolian EBA (cf. Blum et al.2014; Efe 1988; Efe and Türkteki 2011; Eslick 2009; French 1967, 1969; Lloyd and Mellaart 1962; Sarı 2011, 2013; Seeher 1988; Türkteki 2010, 2012), the same cannot be said for central Anatolia. The area is still today affected by the lack of extensively-excavated sites, stratified contexts and detailed publications, a problem particularly acute in the southern part of the plateau (Konya and Karaman regions). On top of this, mountainous regions such as the Black Sea range and the

Taurus Mountains are still largely unexplored. With the exception of Alişar Höyük, excavated in the 1920s and yielding a problematic stratigraphic sequence, there are no stratigraphic pillars east of Küllüoba and north of Gözlükule. Despite early attempts to bring this heterogeneous corpus together (Huot 1982; Orthmann 1963a), the local pottery sequences are still little understood. The case of Alacahöyük's "Royal Cemetery" epitomises a severe lack of understanding of these sequences: while the funerary assemblages were almost universally dated to the latest 3rd millennium, a recent radiocarbon sampling programme revealed that they belonged to a much earlier horizon, c.2850-2350 cal BC (fig.1.11). Recent excavation projects at major centres like Büklükkale, Kültepe, Yassıhöyük and Ovaören, while still largely unpublished, however promise to significantly improve our understanding of central Anatolian EBA archaeology.

In addition, until recently there has been little reliance on radiocarbon dating to construct absolute chronologies and scarce integration of the radiocarbon dates themselves into any existing relative chronological framework (but cf. Kouka 2009:table 2; Şahoğlu 2005:fig.2; Türkteki 2010:table 11). Although there are some 300 published samples coming from 23 EBA Anatolian sites (fig.1.13), they are often not directly discussed in relation to their (hopefully sealed) context. They are mostly concentrated in western Anatolia and the north-western corner of the central plateau, with Troy and Demircihöyük representing the sites with the largest radiocarbon dataset spread across the settlement's stratigraphic sequence. In particular, the relative and absolute dating of the EBA Trojan sequence has been at the centre of a heated debate for over half century (cf. Mellink 1992; Yakar 2002 for detailed discussion), and were a key point that Korfmann's excavations were hoping to solve (1989). However, the new cycle of investigations seems to have onlypartially settled this issue. On the one hand, a re-examination of 70 radiocarbon samples and their position within the stratigraphic sequence clearly and convincingly places the beginning of Troy Ia around 2900-2850 cal BC, and the end of Troy IV around 2100-2050 cal BC (fig.1.12, Weninger and Easton 2014). On the other hand, the relative stratigraphic sequence seems to have still several lingering problems in terminology, as well as in the position of individual contexts and the correlation with Blegen's stratigraphy, particularly for Troy III and IV. What is worse, the stratigraphic sequence of the renewed excavations is presented differently by different collaborators of Korfmann (cf. e.g. Blum 2012; Blum and Riehl 2015; Sazcı 2005; Ünlüsoy 2010; Weninger and Easton 2014).[1] So, until an agreed stratigraphy of Korfmann's cycle is published, the employment of Troy as a yardstick for the whole of the Anatolian EBA remains problematic.

[1] Particularly problematic is the presumed occupational hiatus between Troy III and Troy IV (spanning one-two centuries), which is identified by Wenigner and Easton (2014:189) but is not perceived by the analysis of Blum and Riehl (2015:fig.5).

1.4.2 The chronological framework of this dissertation

Given the difficulty of personally re-assessing the chrono-typological regional sequences, I made the conscious choice of relying on the work of Turan Efe and his collaborators (working at Bilecik University) as a guideline to understand the correlations between different sites in western and central Anatolia (for the most updated discussion, cf. Sarı 2011; Şahin 2013; Türkteki 2010). There are several rationales for this choice:

1) Efe's participation in the excavations of Demircihöyük and Troy provided him with first-hand knowledge of stratified pottery at two of the best excavated sites in EBA Anatolia (cf. fig.1.21);

2) Efe's understanding of relative chrono-typological correlations at the regional level is informed by the excavation of Küllüoba, an ongoing project started in 1996. The site has been excavated with the highest methodological standards, has a relatively unproblematic stratigraphic sequence uncovered across 1ha of excavation trenches, and is being extensively published. Furthermore, it is much more central to the study area than Troy and has numerous documented interregional contacts with both western and central Anatolia, including pottery imports (Efe 2007, xxx). Lastly, despite the scarcity of radiocarbon dates at the site (but see Efe and Fidan 2008: xx), its relative stratigraphic sequence can be very tightly compared with that of Demircihöyük which provides a radiocarbon-dated sequence spanning c.2850-2550 cal BC (Weninger 1987);

3) Over the last three decades, Efe and his team's work has consistently focused on linking together individual site sequences into a coherent framework (Efe 1988, xxxx; Efe and Türkteki 2005, 2011; Sarı 2011; Şahin 2013; Türkteki 2010). Their efforts have resulted in a much finer relative chronological resolution at least for c.25 Anatolian key sites (mostly in the west), and allow to dramatically improve the chronological resolution from c.300-400 years (in the tripartite system) to c.100-200 years, especially if available radiocarbon dates are consistently employed.

My adoption of the Bilecik school's chronological framework comes however with an important change in how the "EBA phenomenon" is conceptualized. Efe and colleagues employ two cumbersome terms (the "Transitional period into the EBA", c.3200-2900 BC, and the "Transitional period into the MBA", c.2200-1950 BC) to describe two phases that link the "proper" EBA with the preceding and succeeding periods. The former is still scantily known archaeologically, given the scarcity of stratified contexts. The latter is instead well-represented across western and central Anatolia by significant cultural and socio-political transformations, probably in part triggered by rapid climatic changes (see below, cf. also Massa and Şahoğlu

2015). I included both periods into the “EBA phenomenon”: with regard to the 1950 BC lower chronological boundary, the establishment of Assyrian commercial emporia clearly marks in my opinion the beginning of a new era in Anatolian history, one in which the various local territorial entities take direct part in the socio-political, cultural and economic dynamics of the Near Eastern sphere (cf. section 1.5.2). The upper chronological boundary is admittedly much more blurred and less definable as a break with earlier LCh traditions, in part at least because extensive, well-excavated and well-published contexts are rare. I however wanted to extend the beginning of the EBA into the late 4th millennium because, in my opinion, the foundation of Troy (around 2900-2850 cal BC) is only the mature stage of a process started much earlier.

In addition, a large portion of this dissertation aims to correlate episodes of cultural transfer across an area encompassing Anatolia, Upper Mesopotamia and the Aegean and needs to compare directly various regional chronological sequences. I have thus decided to offer absolute calendric dates for individual contexts and archaeological horizons whenever feasible, and to forgo the traditional Anatolian tripartite system (EB I, EB II, EB III) currently employed in most primary and secondary sources. As already outlined, this is a relatively straightforward exercise for western Anatolian contexts; however, the situation on the central plateau is more difficult to disentangle. Thanks to more intense contacts between central and western Anatolia after c.2500-2400 BC (and consequently closer similarities in material culture), calendric dates can be suggested for specific late EBA contexts and artefacts. For earlier periods, however, only Alişar Höyük has a sufficiently well-published stratigraphy to roughly estimate absolute dates. Figure 1.14 provides a synoptic table of individual stratigraphic sequences for key sites in western and central Anatolia, their suggested correlation and their estimated absolute dates.

I am aware that a generalised use of calendric dates presents its own dangers: above all, it risks supporting a false sense of chronological accuracy, but also it might simply replace the existing “EB I”, “EB II”, “EB III” concepts with other equally problematic labels. To limit this risk, throughout the analysis, mention of calibrated dates BC (“cal BC”) will be restricted to archaeological features that can directly be linked to radiocarbon samples by stratigraphic association. In addition, stratigraphic levels of individual sites (e.g. Poliochni Yellow, Troy IIc, Kanlıgeçit KG 3, etc.) will be consistently cited. For simplicity, I will instead employ traditional relative chronological frameworks for periods not covered in detail by this dissertation: Late Chalcolithic (c.4000-3200 BC, LCh henceforth), Middle Bronze Age (c.1950-1650 BC, MBA) and Late Bronze Age (c.1650-1200 BC, LBA).

1.5 The historical background

Most publications refer to the EBA as a phase of growing social complexity, with the establishment of stable elites, the intensive exploitation of metal resources and the development of extensive long-distance exchange networks especially with the Aegean and Mesopotamia (Bachhuber 2015; Düring 2011b:257-302; Efe 2007; Özdoğan 2011; Şahoğlu 2005; Sagona and Zimanski 2009:172-220; Zimmermann 2009). As recently suggested (Horejs 2014; Schoop 2011b), these different processes, while all clearly present in west and central Anatolia at around 2700-2600 BC, have however a much longer period of elaboration that seems to start around the mid-4th millennium. Furthermore, there are at least three other factors which underpin the particular character of the Anatolian EBA: firstly, growing research on the palaeolandscape suggests that the 3rd millennium is a pivotal moment in the relationship between humans and their environment, when human communities start to modify their surroundings and to exploit resources on a scale previously unseen. Secondly, climatic records across the Near East detect progressive aridification from c.2500 BC onwards, a process that culminates in a wave of droughts between 2200-1900 cal BC and that induces a range of different social responses. Thirdly, there is a change in the relationship between different human groups, with endemic fighting for the control of routes and natural resources becoming increasingly common. The following section thus tries to briefly delineate the main features of the EBA cultural horizon by following these main themes.

1.5.1 The 3200-2700 BC period

This phase is marked by a change in the relationship between human communities in Anatolia and their environment, the intensification of what Andrew Sherratt dubbed the "Secondary Product Revolution" (1981), and whose earliest stages are now more firmly attested in the Chalcolithic period (Halstead and Isaakidou 2011). It is characterised by a more intensive modification of the surrounding landscape, and a more efficient exploitation of domesticated animals and their products. The results of better-published survey projects seem to indicate a rapid growth in size and number of settlements during the early-mid 3rd millennium, including expansion into areas that were previously sparsely occupied (Massa 2014a:fig.7). Intensive agriculture (aided by the probable introduction of the plough in certain settings) and deforestation, documented in the pollen records at the turn of the 3rd millennium (Kuzucuoğlu et al.2011:182; Roberts et al.2011b:156-158), are probably among the main factors that allowed the occupation of more marginal ecological niches. They also seem a necessary technological prelude to the growth of large centres during the later part of the EBA. The occurrence of grape pips and crushed olive pits (e.g. at Poliochni Blue, Beycesultan XV, Yenibademli Höyük III.3

and Troy IIa) further suggests the intensification of horticulture for the production of wine and oil (Bachhuber 2015:41; Cultraro 2013b:110; Hüriyılmaz 2014:22; Riehl and Marinova 2008:308, fig.4). This period also witnesses an increase in scale and number of primary and secondary metallurgical activities (sections 6.2.2-6.2.3). Copper-arsenic alloys first occur in the early 4th millennium and become widespread in the early EBA, while tin bronzes are first used around 2900-2800 BC and become fairly widespread towards the end of the EBA (Yener 2000). Silver extraction is already documented in the early 4th millennium, while exploitation of primary gold deposits probably begins in the early 3rd millennium. The appearance of complex metalworking techniques such as multi-valve casting, lost-wax, repoussé and filigree already in the early EBA (e.g. Poliochni Blue) further suggests the presence of specialised artisanship. Around 3000-2800 BC, substantial stone-and-mudbrick walls encircle most western Anatolian sites (e.g. Troy, Limantepe, Thermi, Bademağacı, Poliochni, Bakla Tepe and Hacılar Büyük Höyük). While these works cannot unequivocally be interpreted as defensive measures against attackers, they can be more directly linked with emerging elite groups and their ability to coordinate large community efforts. Within the Kızılırmak bend (the later "Hittite heartland"), strong contacts between Karaz/Early Transcaucasian groups and local communities can be detected, with technology transfer (metallurgy, pottery) and the adoption of architectural elements (circular houses, portable anthropomorphic hearths). The groups of this area remain generally village-based, while the only large, organised centre is at the moment represented by Alişar Höyük (c.10ha). The southern part of the central plateau and the Black Sea region are almost totally unknown during this period due essentially to a lack of stratified and well-dated contexts. In this period, interaction between different areas seems limited, as for example shown by the starkly different pottery traditions and the general lack of direct parallels in archaeological assemblages far away from each other (Efe 2006a; Efe and Türkteki 2011; Sarı 2011).

1.5.2 The 2700-1950 BC period

The later EBA in west-central Anatolia is characterised by a gradual but steady increase in social complexity, roughly contemporary with the "Second Urban Revolution" in northern Syria (cf. Akkerman and Schwartz 2003:233-238; Ur 2010). This is archaeologically detectable for instance by the growth of many major settlements up to areal extents of 20-30ha or more, such as Limantepe, Hacımusalar and Beycesultan in the west, Alişar, Kültepe, Yassıhöyük and Acemhöyük on the plateau (figs.1.15-16). Most medium to large sites, when sufficiently excavated, also show the presence of monumental buildings, and there is often a clear separation between public areas and domestic quarters. The earliest large public building so far excavated, at Küllüoba IV E-B, is dated around 2600 cal BC (Efe and Fidan 2008), although the size of the site (4-5ha) and its position at the north-west margin of the plateau suggests that earlier monumental complexes may have existed further south (fig.1.17). These larger sites seem to function as first- and second-tier regional centres within a group of much smaller villages, as detectable in the Çivril and Konya plains (Massa 2014a:106-107). In a few cases (cf. the Çivril and Elmalı/Gölova plains), there is good evidence for their direct control over a surrounding territory through small fortified sites at river crossings or mountain passes (fig.1.18 and fig.4.12). Warfare becomes progressively more visible in the archaeological record, at least from 2700 BC onwards, through the large range of weaponry deposited in graves, the high incidence of weapon injuries in all burial contexts with osteological analysis and numerous episodes of settlement destructions (Massa 2014a). From c.2700 BC onwards there is an increase in detectable long-distance interactions between the different areas, witnessed for instance by the progressive standardisation of burial customs (Massa and Şahoğlu in press) and in the spread of the megaron and megaroid architectural plan (especially for public/elite buildings) from western Anatolia into the central plateau. It is also detectable in pottery manufacturing traditions, e.g. in the widespread occurrence of red-coated thin-walled wares and a distinctive set of drinking/dining vessels from c.2400 BC onwards (Türkteki 2010, 2012), and in the convergence towards a more uniform pottery style ("Proto-Hittite") on the central plateau after c.2200 BC (Efe and Türkteki 2005). Contemporary with these developments, there is also an increase in the circulation of finished objects, raw materials and technologies within Anatolia and with surrounding regions (Efe 2007; Şahoğlu 2005). Among them are jewellery, raw semi-precious stones and tin, weaponry, specific types of drinking vessels, but also the potter's wheel technology (Türkteki 2010) and metrology (Rahmstorf 2006b, 2011a), the latter two clearly betraying an Upper Mesopotamian/Levantine origin.

Between 2200 and 1900 cal BC climatic conditions rapidly decline, with a wave of droughts hitting the whole Near East to different degrees of severity, roughly contemporary with the collapse of the Akkadian Empire and the demise of many Upper Mesopotamian territorial polities (Kuzucuoğlu et al.2011; Kuzucuoğlu and Marro 2007; Matthews J 2011; Smith A 2005; Weiss et al.1993). In Anatolia, although still little understood, this period seems to witness, on the one side, a partial disruption of long-distance relations between Anatolia, the Aegean and Mesopotamian worlds, and on the other side a phase of intense socio-political re-organisation (Massa and Şahoğlu 2015). A significant decline in settlement numbers is detectable in most surveyed plains, and concomitant destructions are reported at most excavated sites (Massa 2014a). However, while these data cannot be underestimated, archaeological data seem to show a general continuity in material culture from the previous period, suggesting a process of centralisation with internecine fights, possibly triggered or aggravated by unfavourable climatic conditions. When the first written texts provide direct evidence about socio-political conditions in central Anatolia (at c.1950 BC), the area is divided into various territorial polities ruled by royal couples, regulated by a large bureaucratic apparatus and integrated into the Near Eastern sphere (Barjamovic 2011:2). It is unlikely that this transformation had happened in just one or two generations, and the beginnings of this process might need to be found in the final centuries of the 3rd millennium. Towards the end of the EBA, the area east of the Kızılırmak bend also seems to be integrated in the wider network. The establishment of the Assyrian emporia in central Anatolia at c.2000-1950 BC, traditionally marking the beginning of the MBA, represents a catalyst for a series of radical changes. These include the adoption of centralised administrative practices (writing, pervasive use of metrology and sealing), the formation of territorial polities in large parts of the central plateau (and perhaps in western Anatolia), and the appearance of more complex forms of social stratification and craft specialisation.

1.5.3 The human landscapes of EBA Anatolia

Results from some of the more thoroughly-conducted prehistoric site surveys show that, at least in the main valleys, the density of mid-EBA (c.2700-2400 BC) mounds is 4-11/per 100km^2 (fig.1.19). Yet these figures do not account for silted-over or destroyed höyüks, and any non-mounded settlements (e.g. short-lived villages, wattle-and-daub settlements, or isolated farmsteads) that would not be easily detected with the survey methodologies normally employed in Turkey. Even with these conservative estimates, contemporary mounded settlements would have been 3-6km apart, or c.40-70 minutes' walk from one another (figs.4.1, 4.12). The rough site-size estimates provided in well-published survey projects (Abay 2011; Efe 1990, 1995, 1996) suggest that the majority of the EBA mounds (90%) are between 0.3 and 3ha, c.7% between 3 and 15ha, and c.3% between 15 and 30ha. Considering that, in agglutinated settlements (as is the case of Anatolian ones) the average population density could be as much as 300 people/hectare (cf. Korfmann 1983:217 for Demircihöyük, Hertel 2014 for MBA Kültepe's lower town), a typical EBA Anatolian community would have counted between 100 and 1,000 people, with a few centres around 5,000-10,000 inhabitants. In the absence of projects targeting the highlands, we know very little about population densities in the uplands, though they were probably several times lower than in the plains, much sparser and composed of smaller settlements, rarely exceeding 1-2ha.

Furthermore, given the high densities of EBA sedentary settlements, the main valleys were probably dominated by agrarian landscapes. Substantial storage facilities from better-documented contexts (e.g. at Poliochni, Troy, Demircihöyük, Seyitömer Höyük, and Resuloğlu) indeed point to an increased emphasis on agricultural production throughout the 3rd millennium,[2] whose surplus might have been the economic basis for the growth of more complex forms of social organisation (cf. Bachhuber 2015:137-140). The relatively unbroken central plateau represents the main agricultural basin in Anatolia, while smaller basins are found within the Gediz-Büyük Menderes triangle and the Antalya plain; unsurprisingly, these areas are also hosting all the largest settlements known to date (fig.1.20).

1.6 Data collection

1.6.1 The nature of the dataset

The analysis presented in the following chapters is based exclusively on already published data. This corpus is quite heterogeneous not only for the varied nature of the information involved, but also because of very different levels of accuracy (e.g. of spatial location, dating and typological attribute), the various scales at which it might be analysed and the different analytical tools with which it could be studied. The key datasets used here include:

a) Approximately 3,700 individually-recorded artefacts from 169 sites that cover an array of types ranging from weaponry to jewellery, from ritual items to working tools, from amulets to drinking vessels, from high-status objects to objects of daily-life. The artefact types chosen for recording were those that seemed to offer the most analytical potential in the present state of our evidence (cf. chapters 5, 6 and 7);

b) Aggregate assessment of pottery and chipped stone assemblages from 46 sites (chapter 5);

c) Characterisation of the resource landscapes for metal, obsidian, lapis lazuli and ivory in Anatolia, the Aegean and the wider Near East (chapters 6 and 7);

d) Around 800 surveyed and excavated sites that were employed in the analysis of routes (chapter 3), in the study of interaction at the local scale (chapter 4) and to understand patterns of social complexity at the regional level (chapters 1, 8);

e) Features associated with Anatolian roads/routes dating between c.1300 BC to AD 1500 (chapter 3);

f) Architectural plans and all associated material assemblages from the sites of Karataş and Demircihöyük (chapter 4).

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[2] While there is at present no archaeological evidence for irrigation in EBA Anatolia, Old Assyrian texts clearly document the practice around Kültepe/Kaneš in the 19th century BC (Dercksen 2008). Could have irrigation practices (with related technological know-how) been introduced in Anatolia already in the late EBA, particularly in the Konya and Kayseri plains?

Because of their heterogeneity and complexity, the above datasets will be justified and presented in more detail in each chapter where appropriate, alongside summary tables and references. The terrain models and hydrological features that appear as base maps throughout have been downloaded from the NASA Shuttle Radar Topographic Mission (90m-resolution DEM, at www.cgiar-csi.org), the NASA ASTER Mission (30m-resolution DEM, at www.gdem.ersdac.jspacesystems.or.jp) and the European Union Institute for Environment and Sustainability (at www.ccm.jrc.ec.europa.eu).

1.6.2 Strategies for data collection and management

At an early stage of my research, I began creating a digital library of all primary and secondary sources (c.2,500 files); works that were not in digital format already (e.g. most Turkish journal articles and most books) were scanned and processed to be text-searchable. This, combined with the online TayProject database,[3] provided me with the wherewithal to perform relatively quick keyword searches through the entire corpus of literature. Furthermore, employment of a spatial database enabled systematic gathering, management, analysis and display of a large amount of data at different scales, in a way that would have been otherwise impossible. As part of this data collection effort, each artefact (or assemblage) in the database was provided with information regarding its basic characteristics: chronological dating, typology, site type (e.g. necropolis, settlement, hoard), site size, archaeological context (domestic/public/cultic building) and the associated find assemblage when information was available. Type-specific information (e.g. different materials, different subtypes, etc.) was included whenever relevant, and any data with a spatial component was optimised for easy, consistent mapping in a GIS that allowed the combination of artefact locations, dates and typologies with other archaeological features and the wider landscape under study. GIS software was further employed to compare distributions of different artefact types together and to carry out analysis on the reconstruction of main natural routes across Anatolia. Whenever possible, quantified approaches have been applied to these datasets, but in many instances the current state of publication forced me to resort to semi-quantitative or qualitative assessment of the archaeological assemblages (e.g. absence/presence/abundance, or low/medium/high). While the latter approach admittedly reduces what kinds of formal analysis might be entertained, it has the crucial advantage of retaining a much larger proportion of the dataset in the analysis.

[3] www.tayproject.org [last accessed 12/07/2015].

1.7 Data quality assessment

There are numerous limitations associated with the available dataset and its possible uses, and the best way to tackle them is to begin with an explicit assessment of data quality. Once such issues with data quality are known, it is possible to implement strategies to reduce their influence or at least to acknowledge their impact in the interpretation of the results.

1.7.1 Archaeological preservation, recovery and visibility

A first limitation is associated with the archaeological preservation of buried artefacts, as affected by depositional and post-depositional processes: items in perishable materials are rarely preserved, while metals are rarely deposited (because they were extensively re-melted and reused for hundreds or thousands of years). A second limitation is archaeological visibility: at the site level, even if artefacts were originally preserved in a given archaeological context, they may not have been collected or studied. This is the case for small or fragile items (e.g. unbaked clay, seeds, small bones, small artefacts, chipped stone) which may have not been retrieved in projects that employed large numbers of workers and/or did not systematically sieve the excavated soil. Also, in cases where publications made only a small selection of the materials, objects may have not have remained visible into site reports because they were deemed unimportant (e.g. items with unknown function or belonging to the sphere of non-elite activities, such as loomweights, spindle whorls, awls and the like).

1.7.2 Intensity of archaeological investigation

The overall low intensity of archaeological investigation across Anatolia is certainly another cogent issue. In the course of my research, I collected references for 169 excavated EBA sites within western and central Anatolia (figs.1.7-1.9); at an educated guess, they represent c.85-90% of all excavation projects in the region to date. This means roughly one excavated site for every 2,300-2,600km^2, a density several times lower than in the western Aegean, where for example Early Minoan excavated sites in Crete amount to several dozens within an area of c.8,500km^2 (so perhaps ten times higher). Furthermore, research in Anatolia is concentrated in three main regions: the eastern Aegean seaboard, and the north-western and northern margins of the central plateau (fig.1.9). Vast areas are at present an archaeological *terra incognita* for what concerns the EBA. A similar patchiness in data coverage can also be seen in survey projects: with few exceptions, they are characterised by very large study areas (1,500-2,000km^2 on average) that only target the plains, and by an extensive survey methodology that prioritises highly-visible mound formations (Massa 2014a:108-109). Recent survey projects (e.g. Doonan

O 2004; Düring and Glatz 2015; Horejs 2010; Pirson and Horejs 2014) indeed show that mounded settlements are scarce or absent outside the major valley systems and that prehistoric sites can only be detected if intensive fieldwalking strategies are employed. According to the online gazetteer of Anatolian sites,[4] mounds represent c.90% of known EBA settlements. This is a further hint that until recently little effort has been spent on analysing human occupation in other ecological niches, or to detect other types of archaeological evidence that would require a more intensive investigative approach to the landscape (e.g. sanctuaries, workshops, temporary encampments, farmsteads, caves, short-lived or locally-shifting settlements and sites with wooden architecture). Excavation projects cover a slightly broader spectrum of site types and ecological niches than surveys, with c.15% of them not belonging to mound settlements or associated cemeteries, although a focus on large (>5ha) settlements is noticeable.

The low density and the patchiness of the dataset, in terms of its spatial distribution and typology, strongly constrains the quality and nature of the analyses that can be carried out on them and further limits the ability to draw a general picture. Largely, the analyses presented in the dissertation will necessarily focus on evidence stemming from sedentary communities residing in the valleys, and even more so communities residing along the Aegean coast or the margins of the central plateau. Despite the suggestion that the southern part of the central plateau might have played a major role in the EBA socio-political dynamics, this cannot at present be proven archaeologically, though future projects in the area will probably revolutionise our current understanding of the history of the region. Further, putative semi-nomadic segments of the Anatolian EBA societies are almost entirely left out of the equation, despite hard evidence in contemporary areas of the Near East that they were a fundamental component in the economic and political dynamics of the region (cf. Bachhuber 2015:47-48; Palumbi 2009; Szuchman 2009).

1.7.3 Accessibility and quality of primary sources

Another important issue is the difficulty in accessing primary sources and their low publication quality. Most site reports are, still today, normally published in Turkish and/or on a wide range of small Turkish periodicals, making their retrieval and wider academic impact more limited. Moreover, these reports rarely provide any discussion about analytical methodologies, general chronological references, stratigraphic matrices or detailed information about find contexts. In order to provide a synthetic picture of the quality of the primary sources in this dissertation, I have tried to assess the level of impact of each EBA site on academic knowledge and

[4] TAY Project: tayproject.org [last accessed: 12/07/2015].

particularly on my research. I employed several criteria, including the size of investigated EBA trenches, the level of exposure of individual archaeological phases at the site, and the quality of site reports (fig.1.21, cf. caption for details). While it is by necessity a subjectively-scored assessment, it seems nonetheless to highlight that there are very few sites (c.20 out of 169) with a sufficiently high degree of documentation and excavation coverage to allow detailed analysis of their assemblages. Indeed most of the data employed in the analyses presented throughout the dissertation stem from these sites. These sites are mostly concentrated in western Anatolia, while well-excavated and well-published projects are almost absent in large portions of central Anatolia and the highlands (fig.1.22). Moreover, there are relatively few sites with an extensive coverage of the earliest EBA phases (c.3300/3200-2900 BC), and they are mostly concentrated in western Anatolia. Vice versa, the latest EBA phases (c.2200-1950 BC) are better-known from sites on the central plateau.

Additionally, despite considerable efforts at systematic coverage, there remain some limitations to my own research strategy, influenced by the availability of texts in the libraries I accessed (essentially, the UCL library in London, the BIAA library in Ankara and the DAI library in İstanbul), by my language proficiency (Italian, French, Turkish and English), and by time, that limited the possibility to investigate all areas under analysis with the same level of intensity. Fig.1.23 provides an assessment of the level of my personal investigation of the regions discussed in the analysis, showing for instance the very limited access to resources on the Balkans and the northern Pontic area, dominated by literature in Russian, Bulgarian and Romanian.

1.7.4 Specialist studies

A last issue is represented by the scarcity of specialist work on topics relevant to this doctoral research, including, for instance, artefact typology. In this field, pottery is by far the dataset with the best coverage, having a tradition of analytical classification started over a century ago and ranging from site-specific publications (e.g. Blegen et al.1950; Efe 1988; Lloyd and Mellaart 1962; Seeher 1987), to general syntheses (Abay 1997; Huot 1982; Orthmann 1963a; Türkteki 2010) to technical handbooks (Horjeis et al.2010a). It can be claimed that there is a fair amount of shared terminology and agreement on how pottery types should be described and analysed. In contrast, the current situation in terms of the classification of individual objects types (e.g. jewellery, weapons, tools) is less developed, and not comparable in any sense to equivalent approaches in prehistoric Europe (e.g. the Prähistorischen Bronzefunde series). While the literature on individual types is quite rich, there is a lack of comprehensive studies or a regional corpus that can be used as an authoritative yardstick, and formal and functional typologies are mostly implicit and not agreed upon by different scholars. Although this clearly represents a challenge, the focus of this PhD project is not on the classification of this vast material, so I have tried as much as possible to adapt existing typologies when available, updating and modifying them to suit my analysis, while avoiding any attempt to create a wholly new classification system that would have required, among other things, extensive primary study of the original artefacts. A factor that partly compensates for this lack of detailed typological analysis is that most of the selected items have very simple shapes and are clearly recognisable and distinguishable from other related items.

Furthermore, in a project that extensively deals with the circulation of goods, it would be important to be able to pinpoint the origin of artefacts and raw materials through geo-chemical characterisation of sources and finished products. Unfortunately, little has been done in this direction for the Anatolian EBA, and there is a notable absence of overarching projects that would provide the funding, scientific control and ability to gather large numbers of specimens. While substantial research has been carried out on obsidian and metals, provenance analysis on pottery is still in its infancy, and virtually no work has been done on terracotta artefacts (e.g. figurines, sealings, loomweights), groundstone, chipped stone (other than obsidian), and semi-precious stones. Given these constraints, the provenance of individual objects can be only suggested based on a combined assessment of the typology (whether the type is “local” or not), chronology (with the source area having older occurrences of a type), intensity of finds (with the region of origin having more occurrences of a type, both intra- and inter-site) and lack of local antecedents. Lastly, craft technology in the context of EBA Anatolia is certainly understudied, and is essentially limited to pottery manufacture, metalworking and chipped stone; this issue is an important constraint particularly because it limits the range of case studies that can be analysed with regard to transmission of technological knowledge.

While all these limitations are certainly weighing on the possible outcomes of any analysis, the recognition of their existence seems in itself an important result of this research and, these notwithstanding, there also remain exciting and as yet under-appreciated features of the Anatolian EBA that I hope to bring to life in the pages that follow.

Chapter 2. Theoretical frameworks for the study of interaction

Interaction is, in the broadest sense, the result of an encounter between two or more individuals in which information (including experiences, stories, ideas, behaviours, technological knowledge) and/or commodities are passed on, intentionally or otherwise. In a world without internet and telephone, interaction always entails movement, which is in itself rarely random in the landscape but is channelled through specific physical and social structures that can be defined as networks, and whose shape depends on a wide number of factors (section 2.1). The contexts in which interaction may happen range from waving to another person in the street to sentimental and sexual relations, from exchanging a pot in the market to waging war on a neighbouring settlement, from visiting a friend's house to the mass movement of large human groups. However, one has to recognise the limited ability of archaeology to access human behaviour from the often scanty material remains at hand, particularly in absence of textual evidence specifically discussing it. This is all the more relevant in the context of EBA Anatolia, where the dataset is extremely patchy in terms of quality and quantity, and where there has been so far little interest in constructing broader archaeological syntheses that could provide a starting point for theory-building (section 1.7). What can be accessed and employed to study interaction in the context of this research is thus mostly limited to commodities (in raw and finished forms), a few cases studies revolving around technological know-how that emerges from the (limited) technological studies, and some behavioural patterns that can to some extent be extrapolated from the archaeological remains.

In the process of carving my own path into the myriad of different approaches to interaction, I made conscious choices about which aspects I wanted to prioritise and to explore in more detail, choices that depended on the available dataset, my personal interests, and my personal skills. I wanted in particular to employ a theoretical framework that allowed me to explore mechanisms of interaction at different spatial and temporal scales, and that provided an understanding on how natural and cultural landscapes may have influenced human interaction during the EBA. In order to do so, I have combined approaches from several archaeological studies on interaction, trying to integrate them into a model that would more coherently fit with the situation of EBA Anatolia; this will be presented below. In particular, following recent works (cf. Bachhuber 2015; Wilkinson et al.2011), I have attempted to integrate two influential archaeological models of interaction and diffusion of innovations, prevalent in either of the two main poles of research surrounding Anatolia (Mesopotamia and the Aegean): "World System Theory" (WST, Sherratt and Sherratt 1991), and "Peer Polity Interaction Theory" (PPIT, Renfrew and Cherry 1984). While the WST emphasises the importance of asymmetrical relations between different exchange partners and the need to contextualise interaction (and societal development) within large-scale phenomena, PPIT focuses on the importance of indigenous processes and the mutual influence of neighbouring societies at smaller scales. Even if I will not explicitly assess them in the framework of this chapter, many of the ideas presented below are deeply influenced by both, and I think that both of these models are useful for understanding mechanisms of interaction at different spatial scales. Beyond these, the fragmentary nature of the EBA Anatolian dataset discourages the pursuit of potentially very informative approaches such as (a) formal network analysis (cf. Bevan and Wilson 2013; Brughmans 2013; Rivers et al.2013) that would require a much denser and better-quality dataset regarding the individual sites ("nodes"), or (b) formal cultural evolutionary analysis (cf. Jordan and Shennan 2003; O'Brien and Shennan 2009; Shennan 2009; Tehrani and Collard 2002), that would necessitate a much more detailed analysis on artefact typology and manufacturing technology than the dataset allowed for.

In the following chapter, I will start by providing my definitions of important concepts employed throughout the dissertation, such as archaeological time, interaction, exchange, trade and networks, and I will look in more detail at how networks are structured in real-world landscapes. I will then try to sketch possible mechanisms of interaction, focusing on organisation of production and distribution, on how innovation is accepted or rejected, and how interaction works at different scales and across time.

2.1 Defining terms

2.1.1 Perspectives on archaeological time

This dissertation is devoted to unravel various forms of interaction at different spatial scales and in different regions; it is also about understanding interaction in different periods, across different periods and through contexts that yield different degrees of chronological accuracy. Thus, a formal understanding of how to study time in the archaeological context of the Anatolian EBA is needed. First comes the recognition that, while time is a continuum, for analytical reasons we need to conceive and study it through the glass of distinct albeit overlapping temporal scales, that is, to look at historical phenomena through chronological windows of varying size (Bayley 1981, 1983, 1987, 2007, 2008; Bintliff 1991; Holdaway and Wandsnider 2006, 2008). As aptly argued by Geoff Bailey, only by employing different chronological scales of analysis can archaeologists identify socio-cultural, economic and political processes that are active across different time spans (2007:200-202). For example, if we employ a single temporal window of analysis (e.g. equal 300-year "blocks") we risk misinterpreting or missing altogether patterns that exist within shorter (e.g. multi-decadal) or longer (e.g. millenary) time frames. In this sense, the French *Annales* school's concept of time, particularly as formulated in Fernand Braudel’s works (1949, 1958), has been widely influential in shaping current views on how archaeologists analyse historical time through the lenses of material culture (e.g. Bintliff 1991; Broodbank 2013; Purcell and Horden 2000). Braudel’s analysis of history employed three main chronological windows:

- the short-term event history (*histoire événementielle*), which relates to individuals’ lives and with politics intended as relations between individuals and groups (Braudel 1958:727-729);
- the middle-term history (*histoire conjoncturelle*), which relates to structural socio-cultural and economic processes unfolding over several generations (Braudel 1958:730-731);
- the long-term history (*histoire de longue durée*), which includes persistent cultural phenomena underlying the very basic nature of human behaviour that often stretch hundreds or thousands of years, approaching geographical and geological time. In this context, it is worth of note that, for Braudel, the dynamic equilibrium of climate, ecology, and interaction human-nature in a given region is one of the most important factors in shaping the trajectory of long-term phenomena (1958:731-733).

One has however to keep in mind that Braudel dealt with a period (the 16th century AD) where extensive written documentation allowed to know the date and details of particular events with a high degree of accuracy. Archaeological time, on the other hand, is generally characterized by varying but significant levels of uncertainty, something even truer for the Anatolian EBA where we have to acknowledge the low resolution of most datasets (sections 1.4, 1.7, fig.1.21) and the absence of written evidence. Thus, our inability to reach high degrees of chronological resolution deeply affects what we can analytically say about the chronological extent of an archaeological phenomenon (Holdaway and Wandsnider 2006:184-185). This is particularly cogent when the analyzed processes occur at the regional and interregional scales and can be detected only through the collation of data from different sites, further limiting the control over chronological accuracy. We then must accept that the analysis presented in the following chapters will present a time-averaged understanding of historical processes (cf. Stern 1993:209). Moreover, in absence of written histories or historiographies, biographies and personal documents (such as those of the ensuing Old Assyrian period), the chronological detail of event history is very difficult to achieve for the Anatolian EBA. It can be only glimpsed at from a very limited number of archaeological contexts, those that a) have been excavated and published to the highest standards, and b) where particular conditions have allowed a very good preservation of the archaeological record in a specific moment of time (such as a sudden fire conflagration of the settlement, cf. Ascher 1961; Binford 1981) or, more broadly, in a short time span (e.g. the quick turnover of architectural phases). This circumscribes our possibility to peek into EBA people’s life to a very few contexts within a very few sites, so it is punctuated both in time and space. Within the context of this dissertation, the only attempt made to reach this chronological scale is in chapter 4, where the (collective) lives and identities of the members of two small village communities are under the spotlight. Instead, most of the patterns identified in the following chapters can be ascribed to the mid-term and long-term history, since their arcs of existence span generally between a few centuries (e.g. the spread of potter's wheel technology in section 5.3) and several millennia (e.g. the continuation of the same trunk routes across Anatolia, the high settlement continuity observed for most centres, or the persistence of specific cultural frontiers, sections 2.1.3.2, 2.2, 3.2, 8.2.3).

2.1.2 Interaction, exchange and trade

Arguably, there are two main facets to interaction: on one side, it can be described as the main force behind cultural innovation (Wilkinson 2014b:25), in that it brings change of some kind, at the material and cultural level. Although difficult to quantify, one could suggest that the degree of change is largely dependent on the intensity of interaction between individuals/groups, and their ability and desire to adopt and adapt external stimuli. On the other side, interaction is also the main force behind identity-building, creating the perception of self and the other through the contraposition of "me/us" and "you" at different scales (Renfrew 1975:5-6). In this sense, interaction is what allows the creation of social ties linking human communities together, is the social glue that eases the development of a shared cultural identity. To bring these two facets together, one could argue that normally the more intense is the interaction *between* two different groups, the higher is the degree of innovation, while the more intense is interaction *within* a group, the more intense is the degree of cultural homogeneity. Intensity of interaction is here conceived as the frequency of encounters and the quantity of exchanged goods/information passing through a specific point in space (a settlement, a road) across a certain amount of time. Although very difficult to quantify in archaeological contexts, I would like to argue that intensity of interaction experienced by an individual, a group, a community, or a society can be seen as a proxy for intensity of innovation: the more they experience interaction, the more likely they are to experience change.

In contrast, exchange can be more closely defined as a form of interaction in which information or goods are *intentionally* passed on or acquired. It often involves some form of asymmetric relationship between the interacting partners, be they individuals, groups or societies (Sherratt A 1993:4; Sherratt S 2010:88). This includes power asymmetry (e.g. military dominance), cultural asymmetry (where one partner is perceived as culturally more influential), technological asymmetry (where one side is more technologically-advanced than the other) and resource asymmetry (where one side has raw materials that the other lacks and needs). Several possible reasons behind exchange can suggested, with the distinct possibility that several of these motivations may coexist to different degrees within the same single episode:

a) Exchange as a way to obtain goods that cannot be produced locally, but that are perceived as technologically superior or more aesthetically pleasing (Wilkinson 2014b:26-27). Alternatively or in addition, such exchange may be a way to acquire the technology enabling their manufacture;

b) Exchange and consumption of goods or information as a way of to maintain social ties between individuals or groups, where the nature of what is exchanged is secondary in respect to the act of exchange itself, that functions as a social lubricant e.g. to strengthen affiliation to a certain group, or an alliance between parties, or to cement social solidarity (Mauss 1990; Morris 1986);

c) Exchange as an expression of centralised control over resources, where a central authority gathers resources (products but also know-how and labour) through taxation, tribute and corvées and subsequently redistributes them, often in the context of complex societies with control over the surrounding territory and with enough military power to enforce the coercion (Finley 1999; Nakassis et al.2011; Polanyi 1966);

d) Exchange as prestige-making activity. Objects and behaviours that have the ability to evoke links with their place of origin, perceived as culturally superior or simply exotic, may be employed by their consumers (and the travellers that brought them) as tools to develop and maintain an ideology of power (Broodbank 1993; Helms 1988). Broodbank further suggests that the control over the exchanges (i.e. over communication routes and thus over access to exotica) is in itself a power-generating activity (1993);

e) Exchange as profit-making activity, i.e. in which *economic profit* is the main goal, and where at least one of the agents is a specialised figure, i.e. a trader/merchant (Bevan 2007:23-29; Doğan and Michailidou 2008:20; Sherratt and Sherratt 1998). While, in the English language, “exchange” and “trade” are considered synonyms, several authors employ the word “trade” to refer to a transaction occurring in a socio-economic context where, at least for specific items, forces of demand and supply are visible and where prices or exchange equivalencies exist (cf. Feinman and Garraty 2010:171). This use of the concept will be consistently applied throughout the dissertation. Trade may be carried out through barter (i.e. exchange of an item for another, based on a shared value system) or through currency (i.e. exchange of an item for a specific amount of gold/silver or other currency). A proto-currency (weighed silver) and a system of price equivalences for a large array of products were certainly in place in the Near East by the mid-3rd millennium (Ross 1999), and might have been the same for certain places in Anatolia, though in absence of texts this cannot be proven. It will be however suggested in the course of the dissertation that trade might have existed in EBA Anatolia in some specific social contexts and for specific products.

2.1.3 Networks

Despite the fact that the concept of “network” is constantly used in our everyday lives and is the object of an established inter-disciplinary body of studies collectively termed as “network science”, defining its meaning in archaeological terms is a rather difficult task. This is in large part due to the fact that these varied disciplines (including physics, economy, ecology, linguistics, biology, neuroscience, computer science, sociology, epidemiology, mathematics) each have different theoretical perspectives, different research questions, different analytical techniques and different terminologies (cf. Albert and Barabási 2002; Newman 2003), making “network” a very imprecise term. Furthermore, we are still far away from a coherent archaeological body of theory to study interaction through networks (Brughmans 2013:624). Thus, several issues have so far received little theoretical formulation, but are indeed of central importance to understand mechanisms of interaction in archaeology:

a) archaeological networks are by their nature always incomplete and often cannot be studied statistically in the same way that modern data can (Brughmans 2013:641);

b) archaeological networks still tend to be investigated in highly idealised spaces, disconnected from real landscapes, and most of the published analysed case-studies ignore the limitations imposed by physical distance and landscape barriers;

c) although archaeological networks and their dynamics are very much scale-dependent, most research is presently conducted at single-scale windows of analysis (Conolly and Lake 2006:248-252; Knappett 2011:9-10, 15-31);

d) archaeology, more than other disciplines, needs to account for the temporal dimension of interaction; however most studies tend to investigate networks in a particular moment in time rather than in their changes through time, even though networks have been recognised as dynamic entities that keep evolving or devolving (Knappett 2011:10; Wilkinson 2014b:65-94).

The concept of network employed here is a set of physical and social structures that channel interaction along specific paths and concentrate interaction in particular places (cf. Bevan 2014:414). The analyses presented in this dissertation are based on the realisation that any modern or ancient network is composed by two fundamental components, which are connected and interacting but are distinct from one another: the physical and the social (cf. Knappett 2011:124-125). Physical networks are the infrastructure of interaction, are the real-world channels through which human movement is funnelled (roads/routes, and concentrations of human activities); social networks are instead composed of people, goods and ideas that circulate within this structure. It seems important to disentangle these separate elements and understand how they may affect interaction, so that the discussion on their configuration and their mechanisms may result clearer. The single elements that compose them, outlined below can be conceived as intertwined and interacting with each other, to different degrees: a small change in one of them may potentially affect all the others, and ultimately alter the structure of the networks, their nature and the intensity of traffic in a specific place/region.

2.1.3.1 Physical networks

Natural landscapes

The research that follows in subsequent chapters seeks to integrate natural landscapes more closely into explanatory models for cultural interaction than is often the case, especially for network-based methods (following e.g. Agbe-Davies and Bauer 2010:18; Knappett 2011:9; Palmisano 2015:183-215; Wilkinson 2014b:25-28). The shape of the landscape affects human travel at a very basic level, constraining movement and restricting the possibility of where a traveller can go and the amount of time required to get there. The intensity of interaction between individuals or communities is thus influenced by three important factors connected with the natural landscape: the nature of the travelling medium, the presence of barriers to movement, and spatial proximity.

The importance of the travelling medium (e.g. land versus sea, desert versus jungle, or mountain versus plain) lies in the fact that different environments may need to be crossed via different transportation (e.g. pack animals/carts versus boats versus pedestrian movement), and may require largely different skill sets, thereby also often implying a long process of adaptation and the development of particular technologies. Travel across the desert and a sea voyage are experiences that necessitate two different mindsets altogether, and rarely the same individual possesses the knowledge to feel comfortable leading both journeys. The ecological interface between two different environments can thus represent an important boundary to social networks, that individuals have difficulty to cross because it would necessitate switching transportation means and acquiring new skills (cf. Bevan 2013:5).

Also, despite the fact that the difficulty in crossing mountains, seas, large rivers and deserts may to some extent be culturally-dependent (related to specialised technology and environmental adaptation), it cannot be denied that these elements do indeed represent physical barriers to movement, that hamper travel in certain directions and instead funnel it along specific “corridors”. And while the natural landscapes are rarely so constraining as not to allow different options of travel between point A and point B, it can be argued that their choice is influenced by some assessment of relative expenditure, i.e. the amount of time and/or effort required to walk a specific path instead of another (section 3.2 for a detailed analysis of this issue).

Lastly, today as in the past, physical proximity between two or more individuals allows for more intense and frequent interaction between them (Expert et al.2011). One can thus argue that generally interaction between individuals or communities that are living close by and that are connected by unbroken landscape is more intense and frequent than with those residing farther away and separated by natural barriers (but cf. the concept of “persistent cultural frontiers” explored below).

Cultural landscapes

Cultural landscapes are spaces where the modification of the natural environment by human action is perceivable through the presence of human-made constructs, be they buildings, graves, monuments, agricultural fields, hedgerows, landscape markers etc. (Knappett 2011:36). Interaction between individuals rarely occurs randomly in the natural landscape, but is instead localised within delimited foci of human activity, such as permanent settlements/cultic sites or temporary gatherings (e.g. fairs, campsites, off-site workshops, quarries, mines, religious festivities and armies), where the chance to meet other people and consequently exchange goods and information substantially increases. Likewise, travel between these foci is rarely random, but rather is funnelled along specific corridors that connect them and that are in part also determined by the abovementioned topographic factors. The more developed is the network, the more formalised become these corridors, with the establishment of itineraries and their transmission from one traveller to the other. In time and with enough traffic, the passage of humans, pack animals and wheeled vehicles favour the creation of beaten tracks, distinguishable from the surrounding terrain cover and thus attracting further traffic (section 3.2 for more detailed discussion). Within the context of complex territorial polities (arguably the case of late EBA and MBA Anatolia), roads that witness higher intensity of traffic might be equipped with a range of associated infrastructures that further ease communication, such as paved/rut roads, road stations, inns, bridges/ferries, roadside military posts/forts and ports (for maritime routes). These are what Toby Wilkinson defined as “highways” (2014b:96-97). Routes and roads can also be denoted by markers that make orienteering easier and may bind them to a “symbolic landscape” (Reynolds and Langlands 2011:417), such as the Roman milestones, the Hittite/Neo-Hittite rock reliefs or the Iron Age/Classical tumuli.

2.1.3.2 Social networks

Agents

Despite our difficulty in archaeology in recognising the individuals behind the exchanges, the human elements of the network are certainly the most important, as they are the prime movers of interaction. Travellers make decisions at different levels, from the choice of the path, to the choice of the travel means, to the choice of what to carry and whom to meet. Their individual characteristics (such as gender, age, status, occupation, affiliation to a particular social/linguistic/ethnic group, cultural background, aesthetic taste) are likely to influence not only their needs, desires and decisions, but also their ability to access specific social networks (Hodder 1977:259-262; Reynolds and Langlands 2011:412; Schortmann 1989). While in the context of EBA Anatolia it is impossible, without textual evidence, to recognise single individuals, throughout the dissertation I will attempt to identify the collective identity of the people involved in different forms of exchange at different scales.

The social context

The social milieu also strongly influences interaction at several levels, including the nature of the exchanged products/information, the intensity of exchange, and a person's ability to cross specific areas. Individuals are unavoidably embedded within a specific socio-economic, political and cultural context and have personal and collective value systems that are not only dependent on economic/technological advantages, but for instance also on aesthetic taste and the social/symbolic meaning of an object or behaviour (Bevan 2007:8-18; Wilkinson 2014b:26-27). Arguably, these socially-bounded systems of value largely determine what is desirable, what is valuable and what is socially acceptable in a given place and time.

Furthermore, archaeology, ethnography and sociology provide a large range of examples suggesting that the intensity and propensity for interaction between people is largely dependent on their pre-existing degree of cultural similarity. All other things being equal, culturally-similar people tend to select each other, communicate more frequently with each other and develop stronger social interactions; these in turn promote further similarity (Axelrod 1997:205; Expert et al.2011:2). ~~Or to put it in other words, the more culturally coherent is a group, the more intense and frequent is interaction *within* the group (Renfrew 1975:5; Rogers 2003:15-16) and the more similarities shared by different groups the more inclined they might be to interact across group boundaries.~~ The flip side of cultural similarity is a kind of cultural friction, where interaction between communities increasingly distant from a cultural standpoint is generally less frequent and intense, and where culture-specific objects or behavioural sets do not travel easily across major socio-cultural boundaries (Sherratt A 1993:13-14; Wilkinson 2014a). Connected to this concept is the idea that high settlement densities (certainly a feature of EBA Anatolia) would create political land- and sea-scapes where any traveller crossing them would need to negotiate their passage with the local communities to the point that their journey could be hampered or prevented. More porous socio-political boundaries can be described as “permeable interfaces”, while more substantial divisions between communities (often quite stable through time, as in the case of the Taurus Mountains between central Anatolia and Upper Mesopotamia) can be defined as “persistent cultural frontiers” (Anthony 2007:103-109).

Carriers

Carriers include all transport means other than the human body and personal accessories such as bags and rucksacks. The level of transport technology in a given society, and the individual decisions of the traveller over the travel mode (partly dependent on cost, section 3.1.5), influence the amount and nature of the goods that can be transported and the speed at which human movement occurs in the landscape. Arguably, carriers that are able to transport bulkier materials and/or allow faster communication reduce the effects of physical distance upon the social networks, thus creating the opportunity for more frequent and intense interaction at larger scales (Beaujard 2011:8; Bevan 2007:19-21). With regard to EBA Anatolia, it will be suggested later that the introduction of wheeled vehicles, longboats, sailboats, horses and donkeys in different phases is partly responsible for the gradual expansion of interregional networks, and that their use becomes more important as exchange networks grow in extent.

Cultural ‘Hardware’

This category includes the vast array of transported material goods, including raw resources and finished products. These objects may move from point A to point B as: a) personal possessions of traveller, such as traders, colonists, partners in exogamic marriage, but also slaves or captives, b) result of voluntary exchanges between individuals, or c) result of forced exchanges, such as tribute or raided goods (Bevan 2007:21-22).

Cultural ‘Software’

Interaction between individuals always entails intentional or unintentional participation in some sort of verbal and non-verbal communication (collectively termed “information”, cf. Renfrew 1975), which is in most cases not detectable at the archaeological level. Examples of archaeologically-invisible interaction range from sharing personal ideas, beliefs, stories, and experiences to information about the exchange itself (e.g. agreeing on a system of valuation, Renfrew 1975:23). It is also likely that in some cases substantial amounts of information would be transmitted about the network itself, for instance knowledge about the road, or about possible problems encountered along the way, or the location of shelter, etc. However, there are some particular forms of verbal and gestural sets that can to some extent be recognised in material culture, such as the transmission of technological know-how and cultural behaviours, which will be discussed in the following chapters.

2.2 The network structure

What do networks look like in the real world? It can be argued that the physical network of transport links across modern Turkey is a small subset of a much larger road system stretching across Eurasia and Africa almost seamlessly. Even though we lack the archaeological evidence, one could suggest that in the 3rd millennium BC it might have been the same, since even then human communities were rarely so isolated as to be effectively disconnected from a web of roads or established routes that ultimately linked the whole continent. In practice, physical networks are extremely large today and might have been so in the past as well; however, in a world without internet and telephone, social networks would have been much more fragmented and restricted in space. The accounts of Medieval travellers such as Matteo Ricci or the Polo family prove that it was theoretically possible to traverse the whole of Eurasia over the course of a few years. Yet, the distances involved, the potential dangers and the degree of political, linguistic and cultural fragmentation made it so that very few people actually attempted the journey (cf. Wilkinson 2014b:92-94 on the literary trope of the Silk Road). Moreover, at present there is no evidence that EBA Anatolia was (indirectly) connected with communities beyond India and Afghanistan, for instance (section 7.2.3).

While the structure of physical networks is quite self-evident, that of social networks is more difficult to disentangle, since the boundaries between one and another are not clearly definable and they are heterogeneous in their social components and in space (cf. Knappett 2011:27, 43-44; Newman 2003:17-19; Smith M 2005:835-837). This phenomenon is acknowledged for networks of different scales by several researchers, that however code it differently in their analysis: from the core/periphery/margin distinction (Sherratt A 1993), to the idea of “cliques”, “communities” or “clusters” that represent more coherent and denser patterns of interaction within a group of people embedded in an otherwise larger and sparser network (Expert et al.2011:1; Knappett 2011:42-44; Newman 2003:17). Furthermore, as already mentioned, in the absence of supporting textual evidence, the archaeological record is essentially unable to recognise personal relationships, and this results in a low visibility of social networks. Equally, while among living communities ethnic affiliation is a central factor in shaping patterns of group interaction (e.g. Barth 1969a, 1969b; Hodder 1977), this is an element that cannot be identified from archaeological remains alone and thus cannot be studied in any detail. Attempting to identify potential social networks is also a process hampered by patchiness in the quality and quantity of the data at hand. In addition, the quantification of homogeneity in cultural traits is largely a matter of scale and analytical perspective: at larger spatial scales, similarities in material culture shared by different communities become more and more tenuous, and it is partly a subjective choice where to draw the imaginary line between similar/dissimilar. For this reason, the social networks suggested in this dissertation have deliberately very fuzzy boundaries, and are conceived as entities with different degrees of internal cohesiveness.

In the absence of an archaeological project in EBA Anatolia that has both enough data resolution to identify small-scale (intra-valley) networks and a large enough extent to allow modelling on the regional and interregional scale, I will employ the modern settlement and road network of the Lake District in southern Turkey to illustrate some of the concepts presented below (fig.2.1, cf. caption for details). A brief glance at the map shows that today (as in the EBA) the physical landscape strongly constrains both settlements (with the majority of population concentrated in the lowlands) and movement between them (with the development of most roads largely restricted to the plains), and that topographic and hydrological barriers funnel roads through a limited number of crossing points. The same factors also promote the formation of communities that experience intense interaction between their members but have fewer contacts with others (what is called a “small-world effect” in network theory, cf. Watts and Strogatz 1998 for the concept), a phenomenon that can occur at different spatial scales (fig.2.2). One could further argue that the mountainous environment that separates the intra-montane valleys in the Lake District from the central Anatolian plateau in the east might act today (as it may well have done in the EBA) as a persistent cultural frontier. This is more understandable if we consider travel times, that are to large extent dependant on transport technology, road infrastructure and terrain (slope and vegetation). While today the whole Lake District network (c.200km in diameter) can be crossed in a few hours with a motorised vehicle and following the main roads, in the EBA it would have taken 5-7 days on foot or with a donkey, and more with a cart (cf. fig.3.8). This suggests that the intensity of interaction between distant communities might have been much lower than today (cf. Rivers et al.2013:111-112, fig.5.5). The analyses presented later in the dissertation do indeed suggest that some clear patterns can be extrapolated from the distribution of large numbers of EBA Anatolian artefact types and behaviours (chapters 5-7). While some transcend and cross over major cultural and physical boundaries (arguably technological knowledge, luxury goods and elite behaviours), many others are very much constrained by them (arguably daily-life items, objects related to the private religious sphere, funerary customs). Intriguingly, the spatial distributions of types in the latter category often seem to revolve around quite definable geographic spaces, areas delimited by the abovementioned persistent cultural frontiers. Even more interesting is that some of these frontiers can be identified in patterns of material culture from later periods as well, and unsurprisingly broadly follow major topographic and hydrological boundaries (section 8.1). This suggests that in several cases distinct social networks composed of different goods/know-how/behaviours and probably different social groups did however produce coherent archaeological assemblages that are spatially correlated across time (cf. Braudel's concept of longue durée cultural phenomena being partly shaped by the environmental conditions peculiar to a given region, 1958:753).

The distinction made earlier about physical and social networks becomes now very useful to understand how differently they behave in real-world landscapes. From the examples provided in figs.2.3-2.7, it seems clear that a single social network normally uses up only a portion of the available road network. The same examples also show how different social networks do exist in the same physical space and may use the same road network. To offer an archaeological example, a Mesopotamian trader and a local farmer might have walked on the main road to Kültepe, one on a 6-week journey with their donkeys to exchange tin and textiles, the other on a daily trip to the local market. While in many cases there is little interlacing between different social networks, others partly share the same members, and witness the circulation of similar types of goods and information. So the boundaries between one social network and another should be conceived as fuzzy, partially overlapping and with different degree of integration.

An interesting pattern that also seems to emerge from figs.2.4-2.7 is that large centres and main roads play in all cases an important role in the movement of individuals; however the degree to which they participate in different social networks varies according to the scale of the network, the identity of the members involved, and the type of goods and information that is circulated. In the example, friendship relations and the circulation of local food products tend to occur also in smaller settlements and employ the local roads more intensely, whereas prestige and administrative networks tend to focus on large centres and employ main traffic arteries more prominently. Chapters 5, 6 and 7 will attempt to analyse these patterns in archaeological contexts.

Even though a formal analytical methodology related to the already-mentioned network science will not be employed directly in this dissertation, given the highly-fragmentary nature of the archaeological record (in particular of the EBA Anatolian record), it is worth mentioning here two key theoretical concepts that have considerable relevance in the following analyses and discussion: those of "hub" and "gateway" (cf. Knappett 2011:39-45; Newman 2003:44; Rivers et al.2013:102). An important recognition of network theory is that flows of materials and information do not run in equal measure through the various components of the networks, the so-called “nodes”, i.e. individuals, groups, or settlements in archaeological terms (fig.2.8). Instead, the intensity of interaction flowing through a specific node is dependent on its ability to draw interaction, either because of its position within the network (more central or peripheral), its geographic location (closer or farther from main routes) or because particular properties that attract traffic (e.g. economic, political, religious significance). Two different types of nodes with high-intensity interaction can be recognised, based on the nature of their relationship with components of the same network and with those of different networks. “Hubs” can be defined as nodes that have numerous connections with other participants of the same network (and are thus central to it), while “gateways” are nodes that have connections with participants to other networks, and thus act as bridges between two different systems (fig.2.9). Certain nodes can be both hubs and gateways, i.e. function both as central sites within their own network and connector sites between otherwise different networks. The EBA site of Hacımusalar, at the centre of the Elmalı plain is a good example of hub, while small EBA coastal sites at the interface between the Aegean and western Anatolian networks (such as Thermi, Çukuriçi Höyük, Iasos) can be described as gateways. Settlements that are both hubs and gateways are Troy and Poliochni, that sit at the interface between several distinct maritime (Aegean, Balkans and Black Sea) and overland (western and central Anatolia) networks.

In one of the very few studies of actual ancient road networks, Bjorn Menze and Jason Ur managed to identify some 14,000 ancient sites and 6,000km of dirt-roads (“hollow ways”) in the Khabur basin, through a decade of satellite imagery analysis (2012). An essential point of their study is that they recognised a strong positive correlation between the physical size of a site (the volume of a tell) and its centrality within the network (i.e. its importance as hub), demonstrating that the size of a settlement grew in parallel with its centrality in the network (fig.2.10, Menze and Ur 2012:786). Even though a comparable analysis cannot be performed in EBA Anatolia, it seems feasible to suggest that similar patterning is likely to have occurred here as well, and it can be proposed that larger sites may be identified as hubs at the regional and interregional scales. To complement this, Naoise Mac Sweeny’s analysis of EBA Aegean social complexity has convincingly demonstrated a close connection between settlement size and the degree of social organisation, with larger sites (hubs) more likely to host public buildings and specialised workshops and to have better access to luxury resources (2004). In absence of better proxies for most of the sites under analysis, it can thus be argued that settlement size can be employed as a rough index to estimate its importance within the social network.

2.3 Mechanisms of interaction

2.3.1 Meeting places

The place where exchanges occur is important for understanding the social context of the meeting and the possible motivations behind it. I already mentioned earlier that interaction is more likely to occur within formalised foci of human activity, and these can be identified at different scales: houses (and specific rooms inside them), public areas of the settlement (squares, streets), workshops, public buildings, elite residential areas, market places, temporary fairs or gatherings outside settlements, and sanctuaries (intra- or extra-mural). During the course of the dissertation, attention will be paid to the location where specific products are exchanged (or rather, consumed and deposited) and specific technologies are employed. It can be anticipated that increasingly larger networks seem to function through increasingly formalised meeting places, and that there is a correlation between the spatial extent of a network and the size of the settlements that participate in it (section 8.2.3).

2.3.2 Organisation of interaction

The degree of organisation behind production and distribution largely shapes the nature and amount of goods/information that are circulated, influences the scale of the social network in which they circulate, and may help to identify the possible rationales for their exchange. The degree of organisation (which really refers to the degree of specialisation) can be assessed on the basis of the following factors: a) the amount of time spent on a particular activity, b) the proportion of subsistence that an individual obtains from this activity, c) the number of individuals involved in it within a region, d) the intensity of production/distribution activities and the amount of surplus that goes beyond the needs of those involved, e) the degree of elite control (Costin 1991:3-4; Helms 1993). Specialisation can be carried out by a single individual, a group or an entire settlement. Concerning production, four main variables that define the degree of specialisation and that are to some extent identifiable in the archaeological record can be suggested, following Costin's work (fig.2.11a):

a) **The socio-economic context**, with particular attention to the degree of control by an elite group over production. At the settlement level, the array of possible situations ranges from independent workshops to artisanal centres fully integrated in the palatial system. Independent craftspeople tend to work in small workshops often within domestic contexts, to produce based on the demand and to manufacture utilitarian goods (*independent specialisation*). At the other end, manufacturing activities sponsored by elite/governmental institutions (*attached specialisation*) tend to be placed near public areas of the settlement, to produce on orders from their patrons and are more likely to generate luxury goods, emblems of power and prestige, and more broadly items with a restricted circulation among the general population;

b) **Concentration**, defined as the distribution of facilities in space, within the settlement and in the wider region. At the settlement level, craftspeople manufacturing similar products can be *isolated*, evenly *dispersed* or *nucleated* within certain areas (for the latter, artisanal quarters or elite areas). At the regional level, craftspeople can be *dispersed* among different communities, or *nucleated* in specific settlements (often larger centres). Higher degrees of concentration tend to underline higher degrees of specialisation;

c) **Scale**, intended as the number of individuals working in a single production unit; the higher the number, the higher the degree of specialisation. Smaller groups of artisans tend to be organised either around a household (hence a parent-to-child transmission of know-how) or an apprentice-master relationship, while a larger workforce tends to be regulated by a patron-waged labour relationship;

d) **Intensity**, defined as the amount of time spent by specialists on their craft (*full-time* versus *part-time specialisation*). Full-time specialists tend to work in dedicated places (workshops), have higher rates of efficiency and their products tend to show better quality and/or higher degree of standardisation.

In absence of texts specifically related to exchange and to individuals running the trade, the degree of organisation in distribution is overall more difficult to detect in the archaeological record, and has been rarely tackled in archaeological literature. It can however be argued that it is dependent on a number of factors including the identity of the travellers, the sophistication of transport technology, and the control of roadways (fig.2.11b).

With regards to the degree of specialisation of the traveller, it seems feasible to employ some of the categories already used by Costin in the context of production: a) intensity (part-time traveller versus full-time trader), b) scale of the enterprise (e.g. single traveller versus small group versus trade caravan), and c) whether he/she is independent or attached to a patron. To some extent, these elements can be indirectly understood by the context in which exchanged goods are found, their amount and their patterns of distribution, and the retrieval of specialised exchange tools (e.g. pan-balances and weights). Another important element of specialisation is represented by the choice of transport carriers: while wagons, donkeys, horses, longboats and sail boats are introduced in Anatolia at different stages of the EBA (section 3.1) and were thus certainly available to the local communities, their acquisition and upkeep was presumably rather expensive (cf. Arbuckle 2009:202; Barjamovic 2011:16, table 1; Broodbank 2000:100-101) and would have been affordable only to a small social segment (particularly elites and specialised traders).

It is also important to stress that higher levels in the organisation of distribution can be indirectly reflected in a tighter control over the communication routes and of specific "landscape funnels" (e.g. mountain passes, fords, valley entrances) along them, which could be exercised by political entities with sufficient power over the surrounding territory. Tangible examples are provided by the presence of small fortified settlements near these landscape funnels, already detectable in the late EBA and likely related to the control of traffic routes (section 1.5.2), or by the presence of military posts along main roads, documented in MBA cuneiform texts (Barjamovic 2011:25-26). Another form of control is represented by the investment of large amounts of funds, time and energy in the active construction of roads (rut roads, paved roads), associated infrastructures (ferries, bridges, inns) and their upkeep (through the payment of specialised personnel), along selected arteries with high intensity of traffic. The earliest maintained roads in Anatolia are documented in the early 2nd millennium BC texts (Barjamovic 2011:19-26), but possibly already existed in the late EBA (section 3.2). These maintained roads (Wilkinson's "highways") were probably conceived as multi-purpose: on one side, they were easing communications (hence attracting more trade along them), on another side they were channelling traffic through certain locations allowing to control (and tax) who travelled and what was transported. Furthermore, highways were certainly indispensable tools for administrative and military purposes, and their development was a necessary element in the process of state-building (Barjamovic 2011:20-22; Lawrence 2011).

2.3.4 Diffusion of innovation

In order to understand how goods and information are spread across social networks, I come back to the concept of "innovation", intended here as a change in behaviours, socio-economic practices, technologies, artefact styles, or fashion in a specific community. I will be here broadly employing a model borrowed from a well-established corpus of sociological studies exemplified by the work of Everett Rogers (2003), which is increasingly being applied to archaeological analysis as well (cf. Collar 2007; Rahmstorf 2011b). Within this framework, diffusion of innovation can be defined as a mechanism of spread of new ideas in a given socio-cultural system, through specific channels (roads/routes), over a specific time span (Rogers 2003:6). Rogers argues that the nature of what is circulated, of the channels and of the social system affects the acceptance or rejection of that specific form of innovation. It also affects the time required for that innovation to be accepted by the community or wider society (2003:12-13). For instance, the more advanced are the communication channels, the easier and more intense is interaction between two individuals/communities, promoting cultural similarity. Furthermore, the more the interacting partners are culturally similar, the more likely is the acceptance of a particular innovation (Rogers 2003:17-19). This issue also affects what is accepted and desirable in a given society: behavioural sets or items that are central to the process of collective identity-building are less likely to traverse significant cultural boundaries, because in the crossing they would lose the added social value that they have in their place of origin (cf. Wilkinson 2014a). A good example is represented by the difference in funerary customs between the various Christian and Muslim populations in Anatolia: despite well over a millennium of interaction and mutual cultural cross-fertilisation, their attitude towards death and the ceremonies before, during and after burial still remains largely distinct. On the other hand, commodities, technologies and behaviours that are less culture-specific (e.g. raw materials, certain forms of prestige items, some behaviours related to elite ideology) are less influenced by cultural friction. An observed pattern is the so-called "innovation cluster", when the adoption of a single innovation opens the way for the rapid adoption of other connected ideas, behaviours and technologies (Rogers 2003:14-15), something that is also perceivable in EBA Anatolia, e.g. in the adoption of sealing practices and metrology around the same time (sections 5.1-5.2).

Further, the process of acceptance of any form of innovation entails several stages (fig.2.12): a) exposure to innovation from an external source, b) persuasion of the validity of that innovation and decision to adopt it, d) replication of that innovation locally, and e) different degrees of adaptation (or re-invention) to fit innovation into local tastes and social settings (Rogers 2003:16-17). In this process, the bottle-neck is represented by the persuasion stage, which can take significant amounts of time to be overcome, or indeed may never be overcome and thus results in rejecting that specific innovation. In chapter 5, I will discuss several examples regarding the transmission of technological knowledge from Upper Mesopotamia/Cilicia to central Anatolia, where the lag between exposure and persuasion spans over a millennium. This delay seems related to the reasons why a specific idea, behaviour, technology or style are accepted in a given society at a specific moment in time. Roger again identifies five elements that influence the persuasion of an individual/group (fig.2.12):

a) the relative advantage of the innovation compared to existing practices;

b) the compatibility of the innovation with the socio-economic, political and cultural system of the receiving individual/community;

c) the complexity of the innovation, hence the ability of the receiver to understand it;

d) the possibility for the receiver to independently experiment with the innovation and reproduce it without external help (trialability);

e) the possibility to observe the effects of the innovation (2003:15-16).

An important final element that largely determines acceptance or rejection of innovation is the identity of the individual(s) proposing it. While the most innovative individuals in a community are often marginalised and have low impact on other people's choices (thus limiting the spread of the innovation they carry), the main agents of change, what he calls the “opinion leaders”, are able to convince many others of the validity of an innovation. He describes them as more cosmopolitan (i.e. more exposed to external stimuli), with higher social status, and well-connected within the social network (Rogers 2003:27), an identikit that seems to fit very well with two categories of individuals in EBA Anatolia: elites and traders (Rahmstorf 2011b:103).

What existing sociological studies do not seem much concerned about is how innovations are diffused in real-world networks. With specific regards to EBA Anatolia, it can be argued that there is a range of possible modes differing in the level to which elites, specialised traders and large centres play a role in diffusion of specific forms of innovation. While for example the diffusion of particular shapes of loomweights has probably little to do with elite behaviour and long-distance exchanges, the spread of administrative practices or prestige items is likely more intimately connected to them. The suggested models should be envisaged as extreme cases in a continuous palette of variations, rather than clear-cut separate situations (fig.2.13):

a) **Wave interaction**, where smaller settlements and lower echelons of society play a bigger role. This concept, then, relates to goods, technologies and behaviours that either revolve around daily-life needs or are more than others imbued with social values that help construct cultural identities at the community level. It further characterises innovations connected with lower levels of specialisation in production and distribution, with little centralised control and likely occurring outside formalised exchange places (e.g. markets, fairs, public buildings).

b) **Dendritic interaction**, where innovation is more prominently channelled through larger centres first (where elites reside), and is then propagated at the local level to smaller settlements. It characterises larger-scale networks that function also via formalised places of meeting such as fairs, markets and public areas, and carries goods and information related to specialised production, often through intermediaries (specialised traders).

c) **Inter-centre interaction**, where diffusion of innovation is almost exclusively limited to large centres, and where elite groups are often the only involved partners and are connected to each other by intermediaries (traders, emissaries). It characterises large-scale networks and the circulation of prestige items and behaviours or technologies linked to the elite sphere, such as artwork or administrative technology.

2.3.5 Networks at different spatial scales

In the above discussion, I have highlighted how the element of scale is fundamental to understanding not only the structure of physical and social networks in real landscapes but also the mechanisms of interaction. In this section, I would like to bring all these observations together in a coherent fashion (cf. fig.2.15). The spatial extent of a social network is constrained by several factors, among which physical distance/travel time, cultural friction and intensity of interaction are the most important. Increasingly larger networks (such as those connecting mid-late EBA Anatolia with surrounding regions) become progressively more fragile and prone to collapse, and can exist only if these limitations are somehow reduced. Possible coping mechanisms are for instance innovations in transport technology and improvements of road infrastructures, both of which might significantly increase travel speed and/or the amount of transportable goods for longer journeys. Better communications, as well as the presence of intermediaries (e.g. specialised traders, emissaries), allow in turn for more frequent and intense interaction at larger distances, while an increase in the intensity and scale of production allow for higher quantities and wider varieties of goods to be exchanged. It has already been argued that the late 3rd-early 2nd millennia BC seem to have witnessed a significant change in the nature of long-distance exchanges, from the almost exclusive circulation of high-value/low-bulk products (small precious artefacts) to a wider exchange of low-value/high-bulk goods as well, such as agricultural produce, wool, and stone (Beaujard 2011:8). Better communications also ease the exchange of ideas, technologies and behaviours at larger scales, hence promoting higher levels of cultural integration at least within specific segments of the society (such as elites and specialised artisans). Therefore, it can be argued that while small-scale networks (e.g. at the intra-valley level) can function even in absence of structured exchange mechanisms, larger networks necessitate significant investment of energy, time and resources for their growth and maintenance. It can also be observed that, at increasing scales, there is a tendency for social networks to employ more extensively formal meeting places and to be channelled via the upper echelons of settlement and road hierarchy (i.e. hubs and main communication arteries). This is more understandable also in light of the fact that main centres are arguably the seat of local and regional elites that tend to attract interaction stemming from larger networks. Also, at least from late EBA onwards, the location of small fortified settlements at specific locations likely reflects the desire to control “funnels” of the road network, a control likely exercised by central authorities at the local and regional level. Further, while informal exchange mechanisms are more often employed in small-scale networks, trade becomes an increasingly common mode of interaction at larger scales, while the consumption of goods/information circulated through larger networks tends to be restricted to increasingly smaller segments of the population. With this in mind, it then seems obvious the reason of the intimate connection between the intensification of long-distance exchange and the increase in social complexity, a trend widely recognised by other researchers for various areas between the Near East and the Aegean (cf. Algaze 1993; Sherratt A 1993; Stein 1998; Rahmstorf 2012). Indeed work specialisation, road infrastructures, the ability to mobilise large amounts of resources and labour, territorial control and also, importantly, demand for exotica are all characteristic traits of early complex societies and are, to a significant extent, associated with the elites, something that will be tested throughout the dissertation, and will be formally re-assessed in chapter 8.

2.3.6 Networks through time

Networks experience cycles of growth, transformation, and fragmentation across time, and a portion of this dissertation is devoted to understand network dynamics diachronically, i.e. how and to what degree they change in Anatolia and neighbouring regions throughout the EBA. Given that the short-term event history cannot be grasped with any detail, most of the discussion regarding diachronic changes will entail the mid- and long-term temporal windows of analysis discussed above (section 2.1.1). Episodes of long-distance exchange are already well-documented in Anatolia during the Neolithic and Chalcolithic periods (e.g. the circulation of obsidian), but noticeably, from the late 4th millennium onwards, different regions of the peninsula get gradually more integrated at the cultural level and exhibit intense relations with neighbouring regions, as witnessed by the amount and variety of archaeologically-visible products, technologies and behaviours shared across the area (Rahmstorf 2011a; Sherratt A 1993; Tonussi 2007; Wilkinson 2014b). I already explored in the previous section the expansion of networks and how increased cultural and socio-economic similarity between communities allows for shared systems of value that enable and are enabled by a wide circulation of desirable products and behaviours. A further point to make is that the appearance of new products for exchange may prompt the inclusion of partners that were initially beyond the core of the network (notably, metal for LCh/EBA Anatolia). The apparent sharp increase in settlement numbers across all major plains between the late 4th and early 3rd millennia BC (section 1.5) would also promote the formalisation of earlier routes and the development of denser road networks. At the physical level, the expansion of the social networks would entail the employment of already-existing routes/roads, though they might possibly experience higher volumes of traffic with subsequent formalisation and construction of associated infrastructures. The routes connecting Kültepe and the Syro-Anatolian plain provide a good example of this (cf. fig.5.35): survey materials found in the intra-montane valley sites point to the increase in typological ranges and quantities of pottery coming from both sides of the Antitaurus mountains throughout the 4th and 3rd millennia BC (Brown 1967), and the subsequent formalisation of the routes by way of landscape markers (Hittite rock reliefs and Roman milestones, section 3.2.3).

What is probably more interesting is how networks experience change: the appearance and disappearance of settlements may alter the network structure at different levels, from the local valley system to the regional and interregional scale, arguably depending on the importance of the settlement. For instance, the foundation of Ancyra and Byzantium in the mid-1st millennium BC and their growth in importance through time brought to a significant re-shaping of the interregional network, with a number of trunk roads being attracted by these large cities to a place where no major centres were located in earlier periods. The abandonment of Demircihöyük (0.3ha in size) in the mid-2nd millennium BC, on the other hand, would have been hardly felt in the road network beyond a 5-10km radius.

New transport technologies may also affect networks, e.g. the domestication of the camel/dromedary (during the early Iron Age) would have allowed more direct connections through the desert, in the same way as sailboats made communications between Levant and Aegean easier and with fewer intermediate steps (Broodbank 2000:105-106; Wilkinson 2014b:50). Road engineering (such as tunnels, bridges, earthworks, paving) would have also permitted less convoluted paths. The appearance of state entities with less permeable boundaries (such as the Hittite, Persian, Roman, Byzantine and Ottoman Empires) would have hampered traffic along certain axes and oriented broad patterns of interaction in different directions. Lastly, mid-/long-term environmental changes such as marsh formation, coastal progradation, aridification, shifting river courses and increased snow-capping at higher elevations would have diverted traffic to different corridors in the landscape (Wilkinson 2014b:107-110).

Despite this, it can be argued that a certain network structural inertia should be expected (cf. Wilkinson 2014b:88-89 for the concept of “route inertia”), particularly in the case of Anatolia where two main factors are in play. On the one side, its rugged landscape constrains movement considerably more than in other contexts (cf. the Khabur plain, Menze and Ur 2012). Since it can be assumed that the main orographic and hydrological barriers would have remained relatively constant over the last 10,000 years, the main landscape corridors would also have remained relatively stable during this temporal span. On the other side, Anatolian (and indeed Near Eastern) sedentary communities often experienced continuous occupation on the same place for hundreds or thousands of years. This is particularly true for larger sites (the so-called network hubs) that normally sprang up in places that not only had good access to primary resources (water, agricultural potential, raw materials, landscape defensibility) but that also were located at important crossroads along main natural routes, and in virtue of their strategic position often experienced an almost uninterrupted occupation sequence from late prehistory until today. This is perceptible not only in the archaeological evidence, but also in the persistence of settlement and landscape toponyms, often for several millennia (cf. Forlanini and Marazzi 1986). Though difficult to gauge, another important element of continuity is that the employment of a road and the knowledge of its existence would attract further traffic, and the inter-generational transmission of knowledge about the route/road itself would reinforce its usage through time (cf. Gibson 2007; Reynolds and Langlands 2011:413-416). Lastly, the formalisation of certain highways (i.e. roads with high volumes of traffic) with the addition of road infrastructure would promote further their employment through time, and would often attract the foundation of new settlements along them. While this topic is going to be a central element of analysis in chapter 3, an archaeological example of its validity is provided here by fig.2.14, that shows how archaeological features associated with roads but pertaining to different periods tend, in many cases, to follow the path of modern roads, thus creating a diachronic palimpsest of road usage.

Chapter 3: Travelling in Early Bronze Age Anatolia

Within the context of this doctoral research, it seems important to address how interaction (hence cultural transfer) may have physically and practically occurred in EBA Anatolia, in order to lay the foundations for the following analysis that will explore in detail the archaeological evidence for exchange at different scales. The previous chapters have already explored the notion that natural and cultural landscapes may have shaped human movement in significant ways, for example that interaction may have been concentrated within specific foci of human activity and may have been funnelled along broad corridors of movement. This chapter will build upon these ideas, and will analyse in more detail the different kinds of transport technology available to EBA travellers (section 3.1), reconstruct the main overland and maritime trunk routes active in the 3rd millennium (sections 3.2-3.3), and provide some rough estimates for travel times across Anatolia and beyond (section 3.4). The potential impact for the results of this analysis on the study of EBA networks will be evaluated in section 3.5.

3.1 Early Bronze Age transport technology

The means of transportation ("carriers") in EBA Anatolia have rarely been the subject of analysis; this notwithstanding, a large range of studies in neighbouring areas suggests that this period witnessed a surge in new technological innovations, namely the invention of the wheel and wheeled vehicles, the improvement of boat construction to stand longer sea voyages, and the domestication of horse and donkey both as pack and ridden animals. The archaeological evidence for their existence in EBA Anatolia will be presented below, together with their estimated cargo capabilities, costs and daily travel ranges.

3.1.1 Wheeled carts

Probably invented around 3500 BC in the northern Pontic area, the wheel and its associated technology rapidly spread west and south and by 3000 BC were very common in both Europe and Mesopotamia, as witnessed by several dozen remains of wooden carts, by Late Uruk texts, by a large range of iconographic representations and by wagon models usually in clay (Anthony 2007:61-75; Bondar 2012; Sagona 2013). In west/central EBA Anatolia, archaeological remains of carts have so far not been identified. While Alacahöyük's cattle burials and paraphernalia found in the graves have often been described as accessories for wagons (e.g. Mansfeld 2001), recent re-interpretation of the possible function of these items and the absence of wooden vehicle remains (in contrast to the well-preserved wooden structure of several graves) suggests otherwise (Bachhuber 2008:190-196; Zimmermann 2008:512-514). However, solid-disk wheel models (fig.3.1) have been found at İkiztepe (c.3500-2900 BC, Alkım et al.1988:pl.75-13), Kanlıgeçit KG 3 (c.2600-2500 cal BC, Özdoğan and Parzinger 2012:fig.193) and Ulucak Höyük "EB II" (c.2700-2400 BC, Abay et al.2000:363). Additionally, wheel ruts carved into the bedrock were apparently associated with the late EBA gate at Limantepe (fig.3.2, Ersoy et al.2011:fig.5). While the evidence for carts is still scarce, and their shape and size unknown, they most probably existed in both western and central Anatolia already by the early 3rd millennium.

3.1.2 Donkeys

The donkey was possibly domesticated in Egypt or the Levant in the late 5th millennium and then introduced into Mesopotamia and the Caucasus by the mid-late 4th millennium (Littauer and Crouwel 1979:23-24; Wilkinson 2014b:47-51). By the latest EBA, donkeys are possibly also present on Cyprus and at Lerna IV (Brodie 2008; Pullen 1992:48). However, despite the spread of domesticated donkey in surrounding areas, there is so far little zooarchaeological evidence for their presence in west/central Anatolia before the MBA. This in large part relates to the scarcity of comprehensive palaeo-faunal studies, which are mostly concentrated in western Anatolia and critically do not cover the late EBA phases (figs.3.3-3.4). Furthermore, the analysed contexts are essentially public areas, i.e. the less likely places where donkey remains would be found.[5] To complicate matters, it is often difficult to distinguish individual equid species in absence of comprehensive assemblages, a problematic issue since central Anatolia has a known wild ass population that was actively hunted (Arbuckle 2009; Summers 2001).

With these limitations in mind, the earliest secure evidence for domesticated donkeys comes from Kaman Kalehöyük IV and Acemhöyük V, both dateable to c.2100-1950 BC (fig.3.5, Arbuckle 2013:56-59; Atıcı 2003, 2005).[6] An "alabaster idol" from Kültepe, similarly dated,[7]

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[5] We do not know whether donkeys (and horses) were normally eaten in the EBA, and if so, to what extent they might have been considered an elite food.

[6] A recent report has suggested the presence of domesticated donkey at Acemhöyük already by level XI (early EBA, Arbuckle 2013). While intriguing, the EBA levels of the site have never been published to any significant extent and their stratigraphy never discussed, so these results should be taken with caution. The quite wide chronological span of three radiocarbon dates provided for level XI (c.2880-2770 cal BC, c.2830-2650 cal BC, c.2580-2500 cal BC) further suggests that there might be significant issues in defining the stratigraphy of the archaeological layers.

[7] The find itself is unstratified (Bilgi 2012:fig.834), but belongs to a well-known category of artefacts that have been found exclusively in Kültepe levels 12-11, c.2200-1950 BC (Öztürk 2013).

offers an intriguing iconographic confirmation. The scene engraved on the figurine (fig.3.5) depicts two equids: one is quite clearly ridden, while the other may be in the process of being loaded. Combined with the extensive documentation from MBA tablets found at the same site that profusely mention donkeys as the main means of transport in the Old Assyrian trade, it seems possible to suggest that the equids depicted are also donkeys. With the available data, the archaeological evidence for domesticated donkeys is thus essentially restricted to the central plateau and to the latest EBA, at least a few generations before the Old Assyrian period. The well-investigated assemblages of Küllüoba, Demircihöyük and Troy also suggest that, further west, they they might have not been present in detectable quantities until the 2nd millennium. This picture is however likely to change in the near future, with the publication of more detailed zooarchaeological work from a larger pool of sites.

3.1.3 Horses

Recent studies seem to concur that the domestication of the horse occurred in the steppe north of the Black and Caspian seas between c.5000-3500 BC, and that probably horse-riding technology was developed in the same area around 2500 BC (Anthony 2007:193-224; Summers 2001; Wilkinson 2014b:48-51). From c.3000 BC onwards, domesticated horses start appearing at sites in the southern Balkans, Iran and, in very small quantities, also in mainland Greece (after 2500 BC, Benecke 2002:39-40; Pullen 1992:48). At the end of the EBA, possible evidence of domesticated horse is also found in the Upper Euphrates Basin and Upper Mesopotamia (Littauer and Crouwel 1979:41-42). Mindful of the same limitations regarding the domesticated donkey (see above), at present the only secure evidence of domesticated horse comes from two sites (fig.3.6). One is Kanlıgeçit in eastern Thrace, where horse bones are found as early as 2600 cal BC (KG 4) and in substantial quantities (2-7.5% in phases KG3-4, Benecke 2012:256). The other is Acemhöyük V (c.2100-1950 BC), however identified from a single bone (Arbuckle 2013:59). Following a decades-long debate on the character of horse remains in eastern Anatolia already by the late 4th millennium (cf. Summers 2001:289-290; also Wilkinson 2014b:48-49), Benjamin Arbuckle cautiously suggested the presence of domesticated horse at LCh Çadır Höyük, although admitting that bones metrics and morphology do not exclude the possibility of wild species (2009).

Even if the presence of domesticated horses is confirmed in central Anatolia during the late EBA, the large, well-published assemblages of Troy, Çukuriçi Höyük, Demircihöyük and

Küllüoba suggest that they may have not been present in detectable quantities in contemporary western Anatolia.

3.1.4 Longboats and sailboats

With regard to maritime travel technology, the first experiments with sail technology seem to have occurred already during the late 4th millennium within the relatively safe riverine environments of the Nile and the Euphrates, and by the mid-3rd millennium sailboats were a common sight even along the Levantine coast, as indicated by literary references and figurative depictions (Bevan 2007:20). At present, the earliest evidence for sailboats in the Aegean comes from a single EM III/MM Ia Cretan seal, dated c.2100-1900 BC; its iconography is closely reminiscent that of Levantine vessels, and thus its introduction may point to an eastern origin of the technology (fig.3.7, Broodbank 2013:353). Nevertheless, since Aegean/Levantine (direct?) contacts were already established at least by the early 3rd millennium (section 7.2.4), new discoveries may push backward the date for the introduction of the sail in the Aegean.

However, extensive Aegean boat imagery (from rock carvings, figurative representations on pottery, seal motifs and clay/lead models) suggest that most EBA sea voyages would have been accomplished with paddled canoes (fig.3.7, Broodbank 2000:96). Based on ethnographic comparisons, modern experimental replicas and details of EBA ship iconography, Broodbank further suggests the existence of a range of canoe-type vessels built with different materials (dug-out, reed rafts and clinker-built) and sizes (from 4-6m to 15-20m in length), that would have accommodated up to 20-25 crew members (2000:99-102). While the introduction of the larger canoes (so-called “longboats”) has been traditionally dated to the EC II (c.2800-2300 BC), recent petroglyphs from Strophilas on Andros may suggest their existence as early as the late 4th millennium (fig.3.7.1, Televantou 2008; cf. also Papadatos and Tomknins 2014 for the implications of this).

Looking at inland water travel, while downstream navigation with barges is documented in Mesopotamia by EBA archaeological and literary sources (Algaze 2008:51-62), at present there is no direct evidence for EBA Anatolia; even 2nd millennium sources very rarely mention riverine transport (Gojko Barjamovic pers.comm., November 2013). Further, according to the British Naval Intelligence, Turkish rivers "*are of little use for transport*" (Naval Intelligence Division 1942:25) and "*had practically no importance as waterways*" because "*generally* *speaking, the currents are too strong and the depths too shallow to admit upstream navigation*" beyond a few km inland (Naval Intelligence Department 1919:55).[8]

3.1.5 Cargo capabilities, costs and travel ranges

While, in absence of archaeological remains and written records, it is not possible to assess in detail the daily travel range and the cargo capabilities of different carriers employed in EBA Anatolia, comparison with analogous and better-documented technologies employed in later periods (which show intriguing cross-cultural and diachronic similarities, Bevan 2013:5-6) allows for some rough estimates. Figure 3.8 summarises these estimates for all suggested EBA carriers, drawing parallels from modern experimental testing (on animals, on humans), ethnographic records, modern replicas, EBA Mesopotamian and MBA Anatolian written texts, and limited LBA archaeological evidence (cf. caption for details). These combined data suggest that, when compared with earlier technologies (essentially limited to pedestrian movement and small canoes), all 3rd millennium carriers provided a significant improvement in cargo capabilities, and that especially carts, longboats and sailboats may have allowed transferring substantial amounts of goods. The underwater site of Dokos in the Saronic Gulf, dated to the late EH II (c.2300-2200 BC) seems enlightening in this regard: while variously interpreted as a shipwreck or a submerged settlement, the admittedly still scantily-published archaeological evidence clearly points to a shipwreck. Not only there are hundreds of intact or reconstructable vessels (one of the largest assemblages in EBA Greece), but also two simple anchors (large stones with a single hole) were found 14m away from the main artefact concentration.[9] Of interest here is that its cargo contained, in addition to large amounts of ready-made obsidian blades and a lead ingot, c.500 vessels ranging from fine table wares, to kitchen wares and storage jars (Broodbank 2000:97; Carter 1998:52; Parker 1992:162; Webb 1992), indicating that bulk goods (ceramics, but possibly also cereals, wine, oil) were transported by boat already in the late EBA.

A particular case should be made for donkeys: although single animals might have been used for exchanges, MBA Anatolian texts suggests instead the organisation of large caravan trains often involving several dozen animals and an equal amount of people, that allowed transporting

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[8] This notwithstanding, Anatolian rivers may have been employed for the downstream transportation of timber logs, as documented for Classical times (Hannestad 2007).

[9] cf. the Oxford Shipwreck Database: http://oxrep.classics.ox.ac.uk/databases/shipwrecks_database/records/1337/ [last accessed on 21/06/2015]. A recent study of the ancient shoreline around Dokos further indicates that the EBA sea levels would have been 5-7m below present levels (Papatheodorou et al.2008:69), i.e. 10-20m higher than the location of the shipwreck itself, whose cargo was scattered between -15 and -30m on a steep scarp.

several tonnes of commodities (Barjamovic 2011). While we cannot uncritically apply these figures to late EBA Anatolian exchanges, it might be surmised that the introduction of donkeys in Anatolia indicates a scale of enterprise beyond the individual or the small group, and it is perhaps not accidental that the earliest evidence comes from two of the most important centres of the (later) Old Assyrian network, Acemhöyük and Kültepe.

With regard to daily travel ranges (i.e. the distance that could be potentially crossed in an average eight-hour trip), newly-introduced overland carriers do not seem to have considerably improved travel speeds (fig.3.8). Instead, carts may have been considerably slower than pedestrian movement, and their use may have been restricted to low-gradient, clear-terrain environments (e.g. major plains).[10] Conversely, notwithstanding the limitations and the perils of sea voyages, innovations in maritime transport technology may have considerably expanded the range of sea-going vessels, in addition to their cargo capabilities, allowing for faster and more direct journeys (cf. section 3.5 for the implications of this).

Despite the clear advantages in employing these new technologies, one should be reminded that several of these carriers might have been quite expensive to acquire and maintain, both in terms of resources, skills and energy (fig.3.8). Carts and particularly boats would have required experienced carpenters, raw materials, (metal?) tools and substantial amounts of time for their building (cf. Sagona 2013). On the other hand, pack animals (cattle, donkeys) and even more so horses would have been expensive to buy and to maintain (shelter, food, water, animal handlers). In certain instances, their employment further implies the involvement of a large number of people in the enterprise, certainly the case for longboats that necessitated large crews (estimated at 20-25). It seems reasonable to assume that longboats, sailing boats, carts, donkeys and horses were generally employed only by a small minority of travellers, people that could afford them, that put them to use on a regular basis and that could organise and coordinate sizeable groups, i.e. specialised traders and elite groups.

3.2 Roads and overland routes in EBA Anatolia

At the most basic level, a road can be described as a line of communication between two or more foci of human activity. A defining element of a road is its recognisability from the surrounding terrain, in the form of a beaten path, rock cutting or paving. It is worth mentioning that paved roads, given the costs, time, organisation and efforts involved in their building and

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[10] Horses of course would be the exception, but there is extremely scant evidence for their use in western/central Anatolia before the MBA; even then, they would have been arguably employed for fast messengers/envoys, rather than to transfer large amounts of goods.

maintenance, were probably very limited in number throughout pre-20th century history, and only present in the context of state entities. During the EBA, the existence of (dirt)roads in west and central Anatolia is very likely, but it has never been explored in any detail. Since they were probably unpaved, they would be difficult to detect without projects involving satellite imagery analysis, remote sensing around settlements, or targeted surveys and excavations, especially since the several meters of sediments deposited during the last 5000 years in all major valleys would have obliterated most of their traces on the surface. A hint for their existence is however provided by Old Assyrian texts of the early 2nd millennium that extensively mention roads, bridges, ferries, inns and guarded passes (Barjamovic 2011). While this level of complexity should not necessarily be retrojected to the EBA context, it at least suggests that earlier road antecedents may have existed. Furthermore, careful analysis of satellite imagery in other areas of the Near East (e.g. the Khabur and Erbil plains) has uncovered a complex network of dirt-roads, so-called "hollow ways", cumulatively stretching for several thousand kilometres and in many cases clearly associated with sites occupied only during the EBA (figs.3.9-3.10, Menze and Ur 2012; Ur et al.2013; Wilkinson et al.2010). While most of these dirt-roads were connecting each settlement with its immediate hinterland and with neighbouring communities (what Toby Wilkinson calls "pathways", 2014b:97), a few roads seem to have skipped smaller villages and only connected larger sites (what Toby Wilkinson calls "highways", 2014b:96).

Understanding the process that leads to the formation of roads is also useful to confirm the hypothesis of their existence during the EBA. While it is generally difficult to understand the genesis of a road unless excavated (cf. Branting 2004 for the exploration of urban streets at Iron Age Kerkenes), the study of modern park trails (i.e. beaten tracks organically created by the passage of a large number of visitors) provides an unexpected help. Extensive modelling and comparison with actual examples revealed that the trails' paths are determined in part by landscape constraints (e.g. vegetation, terrain roughness, topographic or hydrological obstacles, gradient), but also by cultural elements that attract human movement along certain directions or toward certain landmarks (Helbing et al.1997). If enough traffic is funnelled through the same track over a limited amount of time, the trampling of grass will make the track itself more recognisable from the surrounding terrain, attracting in turn more traffic and making it more permanent.[11] While, to my knowledge, park trails have not yet been studied in their development through time, a WW II aerial photograph of London's Richmond Park and its

[11] If we project this back to the EBA period, the introduction of vehicles and the employment of animals for long-distance transport (cattle and, later, donkeys) at different stages of the 3rd millennium would have considerably sped up the process of road formation, since both wheels and hoofs would have contributed to the creation of beaten tracks much more than simple pedestrian movement.

Google Earth 2012 counterpart provide a rare opportunity to follow the evolution of its trails across c.70 years (figs.3.11-3.12).

From both images, it seems clear that the trails are "attracted" by several landmarks, such as ponds and tree groups, and are instead constrained by the lake in the middle, whose shores deflect movement across it and whose bridge instead funnels travel via a narrow corridor. Although an accurate DEM is not available, it seems also likely that their path is to some extent influenced by terrain slope, in addition to presence of muddy areas (in rainy seasons) and location of denser patches of wood. What is more striking is that, when comparing the two sets of trails, many 1945 paths still exist in 2012 (fig.3.13), arguably because the same attractors, funnels and constraints are the same, 70 years later. This pattern seems a good empirical confirmation of the route inertia concept mentioned earlier (section 2.3.6), where relatively stable landscapes and relatively stable foci of human activity promote higher degrees of continuity of road networks through time (Wilkinson 2014b:88-89).

To what extent is this notion applicable to analyse large-scale ancient road networks? It can be argued that, while it is not possible to predict the choices of individual EBA travellers regarding their path from point A to B (dependent on a large number of elements ranging from concerns of energy expenditure or time, to personal motivations, emotions, individual skills, etc), it is however possible to model to some extent the cumulative actions of large numbers of travellers, through time. Studies on modern pedestrian movement show that crowds of moving individuals are in fact rather predictable (mathematically speaking) and can be quite successfully modelled (cf. Helbing et al.2001 for a detailed assessment).

Specifically for the reconstruction of EBA Anatolian large-scale networks, I will argue that while movement in the plains may have been relatively unconstrained (at least from a topographic perspective), there are some landscape funnels or "pinch points" (valley entrances, mountain passes, fords, large settlements) through which a large portion of human traffic was channelled. Being able to locate these funnels would give some fixed points in the landscape that can be used to model the paths of the physical networks. The remaining part of this section is thus devoted to understand environmental and cultural constraints to large-scale movement (the only type that can be successfully reconstructed in absence of detailed archaeological surveys), particularly those that can to some extent be quantified and that can be factored into the analysis. These will be then employed to sketch the path of the main communication arteries (the highways) active during the EBA, both through a landscape GIS-led analysis and the creation of a palimpsest of road usage, which will provide evidence for the repeated use of the same main trunk roads through time.

At this point, it seems necessary to make an important conceptual distinction between “roads” and “routes” (cf. Wilkinson 2014b:94-96 for this). “Roads” are defined by archaeological remains of some kind, i.e. paved surfaces, wheel ruts or terrain depressions created by traffic (cf. the hollow ways) that can be plotted on a map with high spatial resolution (20-30m). While it has been argued that actual EBA roads existed in Anatolia, it is at present not possible to provide any direct archaeological evidence for their occurrence. “Routes”, instead, can be defined as sets of established itineraries through which flows of materials and ideas circulated, and whose location can be broadly suggested by GIS and archaeological analysis of later-period evidence. Because of analytical limitations, they can be plotted on a map with lower spatial accuracy than actual roads, ranging from c.1km when they cross narrow mountain passes, to c.10km when they go through large, relatively featureless plains. From now onwards, the concept of “routes” will be employed to refer to EBA communication arteries, in order to reflect the inability to accurately describe the actual path taken by the (posited) roads.

3.2.1 Environmental constraints to overland movement

Earlier chapters have already highlighted how the Anatolian topography and hydrography may have, more than in other contexts, affected movement and channelled it along certain directions (sections 1.3, 2.1.2.1). Mountain passes, river crossings, deserts and water sources mark specific locales to which travellers would have needed to refer when crossing the country, especially if the journey involved wheeled vehicles and pack animals. Within the central plateau and the western Anatolian valleys, the high settlement density (section 1.5.3) excludes the possibility that the fertile plains could still have supported thick woodland. In the highlands the situation was probably different, and forests would have impeded travel off known trails. Within relatively flat areas, the main movement constraints may have been large watercourses, and the crossing thereof, particularly during spring season. A number of fords, often marked by Classical, Byzantine and Ottoman bridges, aided the crossing of major rivers like the Kızılırmak, the Delice, the Sakarya and the Porsuk, and channelled major routes across them. Though there is so far no evidence for the existence of bridges or ferries during the EBA, MBA texts often mention them (Barjamovic 2011:23), so it is plausible that more rudimentary structures might have existed in the late EBA as well. Indeed, the presence of large sites with EBA occupation near ancient and modern bridges (fig.3.14) suggests that some form of control may have been exercised over the fords.

Movement outside the valleys was made difficult by the presence of high mountain ranges (up to 2,500-3,500m) in the south, north and east, although a number of passes allowed and funnelled movement through them. The majority of the passes in the Taurus and Black Sea

Mountains are, however, at altitudes of between 1,400 and 2,000m (fig.3.15), and are therefore snow-capped during winter and difficult or impossible to cross from early winter to late spring. The western highlands have a lower elevation on average (up to 1,700m) and are cut by large river valleys (including the Gediz, Küçük Menderes and Büyük Menderes) that make them more permeable to human traffic, and effectively channel travel in an east-west direction. In the following chapters, extensive archaeological evidence will be provided that confirms the importance of these alluvial plains (in particular that of the Büyük Menderes) in facilitating communication between the Aegean coast and inland Anatolia.

While landscapes certainly experienced dynamic changes over the last 5000 years, these generally occurred at the local scale, and the major topographic and hydrographic barriers instead remained relatively stable (section 2.3.6).

3.2.2 Cultural elements affecting overland movement

Furthermore, the work of Menze and Ur (2012) on settlement patterns in the Khabur has demonstrated that large centres, seats of economic, political or religious authority, are the most important network hubs and acted as attractors for interaction. In Anatolia, these sites clearly experienced high degrees of settlement continuity (fig.3.16), partly because of the "höyük culture" typical of Near Eastern sedentary societies (whereby villages are built for generations on the ruins of their predecessors), partly because the control of important crossroads was in itself a valuable resource to tap onto (sections 2.2, 2.3.6). If the location of the main hubs was relatively stable through time, it is feasible to assume that also the path of the main roads (the highways) connecting them may have remained relatively stable. In fact, the existence and relative importance (i.e. intensity of use) of roads is intrinsically dependent on the existence and importance of the sites they connect: when the latter wither or grow in importance, so do the communication lines between them (Ramsay 1890:28).

Another element that strengthens this hypothesis is that these highways were probably equipped with infrastructure to support individuals/groups travelling longer distances in order to provide shelter, food, protection, but also easier and faster movement thanks to bridges/ferries (section 2.3.6). Early 2nd millennium texts mention the presence of such infrastructures, including inns to service humans and animals alike (Barjamovic 2011:34-35), and it cannot be excluded that they might have existed already in the late EBA. They would have also been expensive to build and maintain, and would have occurred only along trafficked arteries; their existence and persistence would have reinforced the continuity of such highways through time (cf. fig.2.14). The lower degree of occupational continuity of smaller settlements (fig.3.16) however suggests that local networks may have been more susceptible to change than those at larger scales.

Additionally, even if this cannot be gauged from the archaeological record, one should envisage that knowledge about the roads/routes themselves would have been transmitted down from one generation to the other, as it is clearly the case for the Roman and Medieval period written *itineraria* (cf. Reynolds and Langlands 2011), thus reinforcing the use of the same communication arteries. This is indirectly suggested also by the distribution of a large number of artefacts circulating within the long-distance EBA networks, that repeatedly occur at the same sites along the main EBA routes (section 7.2 in particular). While the focus of this dissertation is the 3rd millennium, it is more than probable that such established sets of paths may have existed, in a less developed form, already several millennia earlier, as indicated by the existence of developed Neolithic and Chalcolithic exchange networks involving the same areas and, in some cases, the same settlements (section 8.3.3).

3.2.3 Reconstructing Early Bronze Age land routes

While the level of detail achieved in the Upper Khabur basin cannot be reached in the study area (but see fig.3.17 for a hypothetical local road network in the Beycesultan plain), it has long been suggested that the main Roman arteries, studied in detail since the mid-19th century thanks to the large corpus of texts and extant monuments, may have followed older non-maintained structures and be the end result of a process of road genesis begun much earlier (French 1993; French 1998; Ramsay 1890:21). This section aims at quantitatively evaluating this assumption, by assessing the spatial correlation of a range of well-studied archaeological monuments dated between the EBA and the Seljuk period (c.3000 BC- AD 1300). The results will be in turn checked against a computational friction map of the landscape to assess the correlation between cultural and the physical landscape factors.

While this analysis has not been attempted before in Anatolia on such a scale, it is indebted to other researchers that have worked on similar topics in recent years. Among them is David French who, thanks to 40 years of targeted surveys across Turkey and his ongoing publication efforts, greatly contributed to our understanding of the Roman road network in Asia Minor (1988, 2012a, 2012b, 2012c, 2013, 2014a, 2014b, 2014c), and was the first to attempt the reconstruction of a pre-Classical road (the Persian Royal Road) using the later Roman network as a template (French 1998). More recently, Gojko Barjamovic (2011) published a human geography of central Anatolia in the early 2nd millennium, employing the vast textual evidence from the Assyrian merchants' archives and landscape analysis to refine the location of main sites, identify routes between major centres and depict in detail the modes of transportation in this period. His study allows a degree of comparison with preceding 3rd millennium contexts. He also relied on the Roman and Byzantine networks and compared them to the position of known

MBA sites to sketch the main communication lines across Cappadocia and the Antitaurus Mountains. Lastly, Claudia Glatz and Anne-Marie Plourde (2011) have demonstrated the tight connection between the Hittite rock-cut reliefs of kings and deities and the main traffic arteries, following the lead of Ramsay who first suggested they could be markers of ancient roads (1890:30).

The first part of the analysis discussed below explores the degree of the spatial correlation between the Roman road network and other classes of archaeological evidence from different periods: EBA main centres, Hittite landscape monuments, Roman milestones, ancient bridges and Medieval caravanserais (see appendix 1 for detailed description of the data employed in the analysis). To do so, the distance of each record from the closest Roman road was calculated (fig.3.18), and the results were then arranged according to the different classes of evidence (fig.3.19). The next step was to calculate the distance of each cell of the 3D model of the landscape (90m DEM) from the closest road. This gave an accurate picture of how much of the study area is within a certain distance of the roads, and allowed to have a background dataset to test the resulting values against the null hypothesis that the locations of these monuments were not associated with the path of the known roads. For example, if 25% of the study area is between 0 and 2km and 35% is between 2 and 4km, it is expected that monuments randomly placed in the landscape also will have similar values (25% of each sample group within 2km, and 35% between 2 and 4km). To assess the statistical significance of the results, a chi-square test was performed (Shennan 1997:104-113). It seems clear from fig.3.19 that all classes of monuments are closely associated with the known Roman arteries: between 49% (EBA centres) and 72% (ancient bridges) of each dataset are within a distance of 2km from the roads, which is the approximate minimum spatial accuracy that can be reached when combining the different datasets together. This figure increases to values between 60% and 85% within a 4km radius. Each monument group behaves differently to the landscape background, and the results are statistically significant at $p < 0.001$ confidence level, except for the Hittite monuments ($p=0.1$) because of their very small sample (23 records in total). These results thus encourage the idea that there is a good degree of continuity in the use of the main highways through time, and support the methodology of employing later-periods road monuments to reconstruct the EBA major highways.

Given this close spatial correlation between certain classes of monument and the Roman network, it it possible to perform a follow-up analysis, tracing the potential 3rd millennium routes from each pair of EBA sites using the Roman network as a template and evaluating the archaeological evidence for the existence of the road in later periods (Hittite to Ottoman, figs.3.20-3.21, cf. also fig.2.14). In the small number of cases where the two sites were not connected by a known Roman road (9% of the total), the modern traffic network was used instead, with the rationale that a present-day (secondary) road largely follows similar landscape constraints to older ones. Each tract from site A to site B was assessed according to the presence of Roman roads and other classes of evidence along it, and was given a qualitative value from “low” to “excellent” depending on the number and variety of archaeological monuments. Figure 3.22 shows the reconstructed EBA routes, divided according to the extent of archaeological evidence (from Hittite to Ottoman) available for each tract. Figure 3.23 also shows the proposed 3rd millennium routes with later ones reconstructed by other researchers: the Persian Royal road (French 1998), the Hittite roads through the Taurus mountains and the main MBA roads in Cappadocia (Barjamovic 2011:214-238).

The last stage of the analysis was dedicated to constructing a map that assessed the ease/difficulty to cross specific areas of the landscape, based simply on physical constraints (slope and impassable terrain), in order to compare them with the reconstructed EBA routes and understand to what extent environmental factors influenced human movement. Andrew Bevan, in a recent review of computational approaches to study human movement across past landscapes, warns about the difficulty of modelling such a complex situation, and stresses that such models might provide rough baseline expectations rather than wholly accurate predictive tools (2013). All the limitations notwithstanding, it seems important to make an attempt.

One of the most promising approaches is inspired by the behaviour of electrical circuits (first proposed by McRae 2006, but see Bevan 2013; van Etten & Hijmans 2010; Palmisano 2015 for archaeological applications), in which the landscape model is treated as a conductive surface with different levels of resistance (i.e. according to slope and impassable obstacles). Multiple points (sources of electricity) are placed on it, and the current flowing between between each pair of points is calculated. The resulting current map is a cumulative sum of all individual pairs. One of the main advantages of this technique is that the potential communication lines between places are not represented as single lines (least-cost paths) but as corridors of movement, with multiple possible paths from each point to the other. The software used in this case is the open-source Circuitscape (http://www.circuitscape.org), the friction map is a slope map reclassified employing Llobera’s pedestrian energetic function (2000) at 250m resolution. Due to the large computational power needed to calculate the “circuit map”, only the main 40 of known EBA centres were selected as “electrical sources”, with as wide a coverage as possible across the area.

Visual comparison between the EBA routes and the aggregate current map created with Circuitscape shows that there is an overall very good correlation between the main highways and the areas where travelling is easier (essentially the major valleys, fig.3.24). The main discordances are observed in the eastern part of the central plateau (within the Kızılırmak bend), where a lower degree of settlement continuity can be observed and where the terrain is overall less restricting than in the west, thus allowing a higher range of travel choices. This notwithstanding, it seems possible to suggest that, despite the changes that the Anatolian road network witnessed through the ages, there is a noticeable continuity that allows us to reconstruct, to some extent, the path of the main EBA routes. While dirt-roads must have certainly existed in the EBA, given the lack or archaeological evidence and the spatial resolution's coarseness of the data employed in this analysis, the proposed route paths should be considered as indicators of broader corridors of movement rather than actual roads physically detected in the landscape.

If we compare the map of these routes with that of the Khabur Basin, we quickly realise that these results represent only a fraction of the existing route network, and only the major highways, while we do not have the networks connecting every single site with the others or indeed a given site's immediate connections with its own agricultural fields. Also, the northern Anatolian routes are not known to any extent, due to a low density of archaeological investigation for all periods and to the absence of recognisable large centres. It is something to bear in mind, that interaction between the plains and the highlands moves across different paths and that this knowledge currently remains elusive. While not the main focus of this PhD, it is interesting to note that some of these routes may have been established at an earlier time, since many of the large centres used in the analysis already existed in the Neolithic and/or Chalcolithic periods, although probably on a much smaller scale (fig.3.25).

3.3 Maritime routes in the EBA Aegean and Anatolia

Given the different nature of the travelling medium (water instead of land), the overall higher variability of environmental conditions, the limited understanding not only of EBA sailing technology but also of ancient navigation know-how and the absence of archaeological evidence for built infrastructures, the reconstruction of sea routes needs to be addressed differently from that of overland routes. To start, it has to be stressed that evidence for prehistoric seafaring in the Aegean can be dated back at least to the Mesolithic (10^{th} millennium) and is documented by the appearance of Melian obsidian on the Greek mainland and the presence of open-sea fish species in coastal settlements (Broodbank 2000:110-117; Davis 2001:44-46; Webb 1999). The slightly later colonisation of Cyprus in the Pre-Pottery Neolithic is at present the earliest evidence for the eastern Mediterranean (Swiny 2001). The earliest evidence of sea travel in the Black Sea goes back to the 5^{th} millennium (Ivanova 2012), although this comparatively late date is possibly due to the lack of detailed studies on the topic.

As suggested earlier for overland routes, the existence of established sets of maritime routes during the EBA is thus very likely, despite the absence of direct textual evidence to support the claim. The analyses presented in chapters 5 to 7 provide extensive indication that some EBA goods, technologies and cultural behaviours could have spread only by sea, as witnessed by their spatial distribution within coastal and island settlements. Certain artefact types further repeatedly occurred only within a small number of settlements that seem to have acted as maritime hubs, a strong indication that preferential routes existed within the Aegean and eastern Mediterranean.

Contrary to overland Anatolia, maritime travel in the Aegean has been subject of intensive analysis by several researchers (Agouridis 1997; Broodbank 2000:chapter 3; Tartaron 2013 among others). These have highlighted how it would be wrong to assume that the sea is a flat table that could be crossed in any direction (cf. also Calvo et al.2011:347 for the western Mediterranean context). During the EBA, navigation would have been dependent on a number of factors, including winds, currents, location of emerged lands, weather, available technology, and individual skill sets, much more than later Classical seafaring (Bevan 2007:20-21; Broobank 2000:68-106). Within this context, it is likely that transport technology may have had a more pronounced impact on the shape of maritime routes than for overland ones. The appearance of the sailboat at the end of the EBA, with the possibility to carry out faster and more direct voyages, may have been one of the reasons why Crete emerged as one of the main hubs of the eastern Mediterranean between late EM II and MM (c.2400/2300-1650 BC, Broodbank 2013:353-355; Sherratt and Sherratt 1998:339).

The remaining part of this section will highlight several environmental constraints to maritime travel, and then propose the path of the major EBA sea routes on the template of Broodbank's seminal work (2000).

3.3.1 Environmental constraints to maritime travel

With regard to sea travel, human mobility in the EBA was constrained by three main environmental elements: the strength and directionality of currents and winds, seasonal variability in weather conditions and inter-visibility between land masses. The major currents in eastern Mediterranean run anticlockwise, from the Nile Delta through the southern Anatolian coast to Crete, while in the Aegean they run north to south from the Dardanelles Straits to Crete (fig.3.26, Davis 2001:9-14). In the Black Sea there are two main gyres also running anticlockwise and they meet north of Sinop, allowing easier crossing from Sinop to Crimea and vice versa (Bauer 2006:117). However, the picture is much more complex, especially in the Aegean, since the location of land masses influences currents at a local level and there is substantial seasonal variability brought by winds and differences in water intake from major rivers, resulting in localised currents that may go against the major ones (cf. Davis 2001:12-14 and Agouridis 1997 for detailed assessment). What seems important for ancient navigation is the speed of these currents: the height difference between Aegean and Black Sea water levels results in a strong west-south-west current exiting the Dardanelles Straits at c.4 knots/hour (7 km/hour) that reverberates across most of the northern Aegean. In the southern Aegean currents are generally slower (2 knots/hour, c.3.5 km/hour), in the eastern Mediterranean slower still at c.0.5 km/hour (Agouridis 1997:3; Menna and Poulain 2010). Similar low values are also attested in the Black Sea with surface current speeds between 0.5 and 0.9 km/hour (Ilyin et al.1998). Local conditions such as narrows and alignment of winds with currents may change the picture and result in faster currents in small areas (Davis 2001:14).

All this suggests that, even with rudimentary EBA ship technology (section 3.1.4), going against the current would have been more difficult in the north-eastern Aegean but significantly less problematic in other areas, especially if combined with favourable winds and with good knowledge of the local conditions. Winds in the area show general seasonal and daily patterns that could to some extent be foreseen by skilled EBA mariners. In particular, during the summer months Aegean winds would have mainly blown in a north-south direction, facilitating southward journeys but complicating northbound ones and forcing cyclic routes for return voyages rather than straight ones (Broodbank 2000:288). The Aegean is however characterised by highly unpredictable weather that could have stranded any travel party and delayed their journey for days on end, and by winds often opposed to prevailing currents that would have required substantial expertise to navigate with (Agouridis 1997:3; Broodbank 2000:93-94). Weather conditions would have further made it very difficult to travel outside the spring and summer months: Classical sources often mention a stop in long sea journeys from November to March, with April and October as interstitial months (Agouridis 1997:6; Broodbank 2000:93).

Lastly, inter-visibility and spatial proximity of emerged lands would have been an important factor in navigation, both for orienteering purposes and for the possibility to seek shelter in case of bad weather. Despite the ability to do so, EBA mariners would probably not have ventured into open sea if not necessary, but would have opted for crossings that could be undertaken in a single day, i.e. between 25-50km. Broodbank's analysis of inter-island distances highlighted how a sea voyage connecting the eastern and western shores of the central Aegean could have been undertaken while virtually always in reach of land, effectively creating a "Cycladic corridor" (fig.3.27). Conversely, circulation in the northern and southern Aegean would have been made more difficult by what he calls "maritime deserts" that required open sea crossings and cyclic return trips (Broodbank 2000:287-288, fig.94).

3.3.2 Reconstructing Early Bronze Age maritime routes

Broodbank's work on Aegean seafaring (2000:chapter 3) will be incorporated here as a template. To reconstruct sea routes in the Aegean, in addition to current and wind patterns outlined above, he considered two further elements: the location of major sites/islands and inter-island distances, with the assumption that EBA mariners were probably navigating in sight of land whenever possible (so-called “coast hugging”). With regard to the first element, many of the main Aegean centres are known, and it is worth noticing that overall Anatolian sites are much bigger than those in western Aegean (compare e.g. Limantepe at c.15-20 ha to Lerna of 2-3 ha at the most), and show a higher degree in settlement's continuity. However, the southern Anatolian coast from Iasos (Bodrum) to Yumuktepe (Mersin) is virtually unexplored for the pre-Classical period (section 1.7, fig.1.22) with the exception of Perge and Silifke that have limited evidence of EBA occupation). The same goes for the whole northern Anatolian coast from Troy (Çanakkale) to İkiztepe (Samsun), thus considerably limiting the available archaeological evidence. This notwithstanding, for the southern coast a later Roman proxy is provided by a recent PhD thesis by Candace Rice, who collected compelling evidence for a string of ports along the whole southern coast at distances of c.10-20 km one from another in the Classical period, with some playing a strong interregional role in the eastern Mediterranean sea networks (2012: chapter 4). To some extent, this must have been the case in the EBA as well.

Turning to the second element, a look at the topography of the major landmasses in the study area suggests that circulation within the Aegean would have been articulated via opportunities for island hopping, while the lack of islands for suitable resting points in the Black Sea and eastern Mediterranean would have constrained sea voyages mainly to the coast. Currents and winds would also have to some extent made difficult travelling in certain directions, forcing to make cyclic return trips, or at least considerably slow down travels if a cyclic return was not feasible, e.g. on the southern Anatolian coast. Considering these factors and the available evidence for the exchange of goods and information across different regions, some major EBA sea routes can be sketched (fig. 3.28), with the pre-emptive warning that they should be considered only a rough approximation. When compared to the proposed land routes, sea routes seem overall less constrained by the environment and more dependent on transport technology.

3.4 Estimating journey times

Given our limited knowledge about the actual paths, environmental conditions, short-term seasonal changes, and actual means of transportation employed during the EBA, calculating journey times can only be a very rough exercise. However it seems useful for two reasons: to provide a crude reference framework to calculate the perceived distance between two places during the EBA, and to explore the length of some of the main trunk routes detectable from the distribution of cultural traits, hence assessing the feasibility of travelling the whole route from one end to the other.

It is worth noting that short-term weather variability would have had a heavy impact particularly on sea voyages. Broodbank, based on experimental journeys with modern replica boats, suggests that at least 1/3 of the time would have been spent in harbour due to adverse conditions (2000:287), an element that has thus been computed in. A further step consists in calculating average journey times from some of the major EBA centres in the study area, an effort summarised in figures 3.30 and 3.31 (cf. fig.3.29 for location of mentioned sites). While I will not comment on each individual trunk route, some general remarks can be made, with the assumption that travellers would have wanted to come back to their home settlement at the end of the journey. Return trips on foot and with significant load from the eastern Aegean coast to the central plateau would have taken approximately 30-40 days (e.g. Efes-Üçhöyük, or Troy-Şarhöyük), while to cross central Anatolia from one end to the other and back 30-45 days would have been necessary (Üçhöyük-Kültepe via Acemhöyük). With the same carriers, return journeys between Cilicia and the central plateau could have been completed in less than 15 days (Kemerhisar-Gözlükule), while a complete Troy-Kültepe return trip could have taken less than 3 months. If performed with pack donkeys, rather than just heavily burdened human porters, all these trips would have taken c. 20-30% less.

With regard to sea travel, it is important to remember that journeys need to add an unpredictable but substantial amount of time spent ashore waiting for favourable weather conditions (calculated here at 1/3 of the total time), and that in some cases cyclic return trip (rather than straight ones) were probably necessary; the figures given here should be taken as minimum values. Assuming travel with faster longboats, Cyprus would have been only two days (or one day and one night) away from the southern Anatolian coast, and three-four days return. The strong connections between the Levant and Cilicia are highlighted by the proximity of Gözlükule and Ras Shamra, 5-7 days away (10-14 days return). Travelling along the southern Anatolian coast from Gözlükule to Rhodes would have taken 22-29 days (44-58 days return), and a direct Gözlükule-Troy voyage would have taken 42-53 days (84-106 return). Within the Aegean, a return trip between Troy and Naxos, including a cyclic return via Lemnos-Skyros-Euboea would have taken 32-40 days. The use of the sail combined with good local knowledge would have probably improved navigation speeds, although it is not possible to estimate it with accuracy.

3.5 Chapter conclusions

Journeys did not occur in isolation from other human groups, but necessarily in a continuous process of mediation with the local communities that not only provided opportunities to exchange goods and information, but also protection, food, water and shelter (cf. Barjamovic 2011:1-37). Particularly for trips longer than a few days, it would have been impractical to carry the large amounts of water and food needed for the whole duration of the travel.[12] This suggests that these resources may have been obtained in large part through negotiation with locals and/or with specialised structures along the way (e.g. inns, or harbours).

Of note is also the existence of numerous EBA centres that would have been at the crossroads of several trunk routes and that mostly witness an uninterrupted occupation until later historical periods. These hubs include sites like Troy, Limantepe, Milet, Efes, Gözlükule, Konya-Karahöyük, Acemhöyük, Kemerhisar, Kültepe, Eskiyapar, İkiztepe, Şarhöyük, Üçhöyük, Yassıhöyük, Beycesultan and the island of Rhodes among others. Some sites of this kind also acted as gateways that linked otherwise largely separate spheres of interaction, e.g. along the eastern Aegean coast, where large centres like Troy, Limantepe, Efes and Milet would have bridged networks that functioned within different transport media (water versus land).

Furthermore, most major players in the MBA long-distance exchanges are already present in the EBA period both for the Aegean, western Anatolian and central plateau networks, and this should make us reflect upon the perceived discontinuity between the two periods, a situation that seems created by divergent academic interests and methodologies (e.g. archaeology versus philology) rather than real socio-economic trends. Regarding the impact of seasonality on movement, while short trips would have suffered less from seasonal changes, longer journeys would have been easier during the late spring and summer months: sea journeys for better weather conditions, land journeys to avoid flood along major rivers and snow-capped mountain passes. In the case of non-professional traders, travels during summer months would also have been easier to combine with agricultural tasks. The analysis above also demonstrated that a variety of transport carriers was available in EBA Anatolia for both land and sea travel. Wheeled vehicles were present in west and central Anatolia at least since the early 3rd millennium. While horses were probably not extensively employed until the early 2nd millennium, donkeys were present at least in central Anatolia from the end of the EBA, and could have been both ridden and used as pack animals. Paddled canoes were certainly employed since Neolithic times, and during the EBA could have reached substantial lengths (up to 15-

[12] A donkey, for instance, would need up to 20-30l of water and 2-3kg of fodder per day, i.e. half of its cargo capability (Barjamovic 2011: table 4); a human would likely require 2-3l of water and 0.5kg of bread per day, which becomes a substantial weight for a longbat with a crew of 20 people.

20m), while sailboats probably started being used in the Aegean from the end of the EBA onwards. Bulk goods may have to some extent been transported, and the available evidence is particularly compelling in the context of sea voyages.

The analysis on estimated journey times offers some suggestions regarding the different scales and modes of interaction in the study area, a theme that will be developed more fully in the following chapters. Most travel episodes would have involved 1-2 hours trips from the home settlement (hence a range of 5-10km), and would have been responsible for the diffusion of most cultural traits that exhibit localised differences. However, the distribution of some objects and raw materials suggests that longer trips may have been relatively common. In particular, the occurrence of some classes of luxury items, elite behaviours and several technologies only or prevailingly in large centres (chapters 5 to 7) suggests that there were direct connections between main hubs, and raises the question on the existence of specialised figures that would have dealt with specific classes of goods. In this regard, the estimated travel times have serious implications in modelling long-distance interaction: while theoretically feasible to make a return trip within the study area e.g. Troy-Gözlükule or Troy-Kültepe in a single season (late spring-summer), the longer the journey, the higher was the degree of organisation needed to arrange such ventures, something true for both sea voyages (crews up to 25 people in a boat for 2-3 months) and land travels (MBA texts mention caravan sizes in the magnitude of hundreds of animals and people, Barjamovic 2011:13, 35).

Chapter 4: Small-scale interaction – a perspective from two EBA village communities

Most of this doctoral research focuses on the analysis of human interaction at the regional and interregional scales and provides a number of case studies on how finished products, raw materials, technologies and cultural behaviours may have circulated in Anatolia and surrounding regions during the EBA. In this sense, the prevailing line of analysis can be classified as "extensive", since the archaeological evidence stemming from a large number of sites will be synthesised to construe broad and time-averaged patterns of interaction. This approach is however prone to the risks of becoming a rather abstract exercise that might exclude from the picture the people that produced these objects, that brought them in their travels, that exchanged their ideas with others. This chapter is designed to act as a reminder that when we discuss funerary practices or obsidian exchange networks or metallurgical technology, we need to retain a constant sense of the real inhabitants and the small-scale dynamics in the equation, to the extent that we can. It aims to counterbalance the extensive character of most of this research with an in-depth and intensive analysis of two small sites that are at the same time quite self-sufficient but also connected to the supra-regional networks that will be discussed in the following chapters. This is especially relevant since a large proportion of the analysed material culture in this PhD is an expression of elite groups, which however represented a tiny minority within EBA Anatolian societies. What is presented here is therefore an effort to adopt the perspective of a small EBA village community, within a smaller temporal window (nearing Braudel’s event history) than most of the archaeological phenomena studied in this dissertation. The analysis will look at how its members interacted with each other and with their natural environment, and how they were embedded in the social fabric of the communities around them. Neither time nor writing space would be enough to perform this sort of analysis for all the c.170 sites employed in this research, and most of these would in any case lack a sufficiently consistent and comprehensive dataset to make that exercise worthwhile. Demircihöyük and Elmalı-Karataş, the two sites chosen as case studies, fit all the parameters necessary for this detailed analysis, and both have an excellent publication record that allows for a contextualisation of the archaeological findings within individual structures. Further, they have been investigated over a large area that covers different parts of the settlement (domestic quarters, public quarter, special-function structures) and documents a sequence of human occupation spanning several centuries. Lastly, their cemeteries are the only ones in EBA Anatolia with a sufficiently large and well-published dataset to sustain a detailed analysis: this permits not only to include their rich burial record into the picture, but to compare them with the information coming from the respective settlements. The analysis sets out with these questions in mind:

1) How are these communities organised, and what can we identify about possible dynamics of interaction within the villages? In particular, is there evidence for specialised activities that may have produced objects to exchange, and/or for communal gatherings and elite buildings? Where are exotica or luxury goods concentrated?

2) What is the relationship between these communities and their surrounding human and natural landscapes?

3) How did these villages fit into wider interregional exchange networks?

What follows is the intra-site analysis of Demircihöyük (section 4.1) and Elmalı-Karataş (section 4.2). The last part of the chapter (section 4.3) is dedicated to integrating these results back into the wider scope of the doctoral research.

4.1 Demircihöyük

Demircihöyük is located in a secondary valley at the northern edges of the large Eskişehir plain, in the north-western fringes of the central plateau (fig.4.1). The site is composed of a small mounded settlement (c.70m diameter, 0.35ha), a graveyard some 400m south-west of it (c.500 EBA burials) and two off-site pottery scatters that were recognised through survey (fig.4.2). The final publications comprise by far the most detailed report of an archaeological project in EBA Anatolia (over 2500 pages), with specialist studies for pottery, chipped and ground stone industry, bone clay and metal finds, faunal remains, human remains, radiocarbon samples, provenance analysis, metallurgical analysis, geology and geophysical prospections (Bachmann et al.1987; Bachmann and Weiner 1987; Baykal-Seeher and Obladen-Kauder 1996; Driesch and Boessneck 1987; Korfmann 1983, 1987; Efe 1988; Jansen 2000; Pernicka 2000; Seeher 1987; Seeher 2000; Weninger 1987; Wittwer Backofen 2000). Also, a detailed analysis of the funerary data was conducted in order to understand possible social dynamics of the village community (Massa 2014b), of which the key results are discussed here. Furthermore, Demircihöyük is located in an area with a high density of archaeological investigation: a systematic regional survey was performed by Turan Efe (Efe 1990, 1995), thus providing an opportunity to place the Demircihöyük finds in a wider perspective. Given this background, the site seems the perfect candidate to explore issues that, for lack of detail, cannot be tackled at many other sites.

4.1.1 The settlement

Demircihöyük lies at one of the narrowest points of the Eskişehir valley (fig.4.1), a major natural route connecting the central plateau with the Marmara Sea and the Troad. It is one of the smallest investigated EBA mounds of the area (0.35ha), whilst the majority of nearby settlements ranges from 1-3ha and a few major sites may have reached up to 20-25ha (Efe 2010). The village is composed of agglutinated houses facing a central courtyard where numerous large underground bins constitute a large storage space for the whole community (fig.4.3). The domestic buildings share many of their external walls and are very similar to each other in terms of house plan (megaroid), size (c.50m^2) and internal arrangements (oven in the left corner of the room, central hearth, sleeping benches and looms in the back rooms). Two houses near the north-eastern gate are bigger than the others, had been better built since the earliest EBA phases and, in one case, exhibit a distinctive plan: their function is unclear because the EBA levels have been eroded away and disturbed by MBA activities, but they may have been a communal place or the residence of the village leader (Çevik 2007:136; Korfmann 1983:243). A strong wall, up to 7m-high and 2m-thick in some parts, surrounds the settlement bonding together the back walls of the houses, is strengthened by a ditch running parallel to it and is interrupted by two gates (Korfmann 1983:242). While probably also serving as a terracing structure and symbolic boundary between the village and the surrounding landscape, its further defensive nature is suggested by the shape of the gates that carefully funnels access and by the construction and re-construction of the same wall immediately after two fire conflagrations, in phases F_1 and M (Korfmann 1983:29, 167).

The detailed typological, functional and spatial analysis of the domestic assemblages shows that the village of Demircihöyük was largely self-sufficient and production was focused around the individual households, with most of the activities performed in the central courtyard and the front room of the buildings (Baykal-Seeher and Obladen-Kauder 1996). Harvesting is indicated by the retrieval of substantial quantities of sickle blades, and food processing is represented by the numerous grinding implements. Textile production is hinted by large numbers of loomweights, spindle whorls and clay brushes (probably used for carding, cf. Bachhuber 2015:69), although no clay stamps have been found at the site. The presence of stone celts, hammers and chisels speaks for small carpentry activities, while awls, borers and scrapers suggest hide/leather processing. Interestingly, as in the case of Karataş (see below), Demircihöyük lacks evidence for metallurgical activity within the site: no slag, crucibles or tuyères, and only a stray flat-axe mould from the surface. The analysis of the small finds shows a conspicuous lack of specialised workshops at the site (Obladen-Kauder 1996:338), although it is possible that some activities may have been carried out outside the settlement. Livestock was probably kept in pens immediately outside the settlement, and summer transhumance may have been a possibility (pasturelands are just 10km away). Korfmann maintains that the storage bins held much more agricultural produce than necessary for the minimum requirements of the inhabitants themselves.[13]

As already mentioned, during its life, the village has experienced three fire conflagrations (phases E_1/E_2, H and L)[14] that seem to have involved the whole settlement and have left *in situ* finds, suggesting that the inhabitants may have been caught by surprise; at least for the event in phase L, the excavator suggests it may have been the result of hostilities (Korfmann 1983:167) based on the large number of small finds and pots, and the re-construction of the perimeter wall in the following phase. Tentative confirmation to this hypothesis can be found in the necropolis, where five adult males and one child bear weapon injuries on their skulls: three of the skeletons can be finely dated through the associated grave goods, and two of them belong to phase L (G.280 and 357). Also, the amount of deposited weapons is much higher in the early phases (L-N, 17% of total) than in the later ones (O-Q, 5%, fig.4.11).

Lastly, 64 short- and long-lived radiocarbon samples from phases E_1-M have produced a sequence very tightly dated from c.2850-2630 cal BC (Weninger 1987). In order to have an internal sequence, and to approximately estimate the date of the phases not covered by the radiocarbon samples, a simple calculation can be performed: 220 years of occupation spread across 12 architectural reconstructions (from E_1 to M) gives approximately 20 years per phase, with the end of the occupation of Demircihöyük and its necropolis (phase Q) somewhere around 2550 BC, and the overall span of the EBA settlement occupation of c.370 years (fig.4.4).

4.1.2 The necropolis

The small graveyard (0.2ha, c.560 interments) is located on a hill 370m south-west of the mound. Based upon pottery typology and comparison with the stratified sequence of the settlement, it seems clear that the cemetery only covers the later part of the village life (phases K/L to Q, c.2700-2550 BC), so the earlier necropolis must be sought somewhere else. Some 120 graves (c.25% of the total) can be more precisely dated to one of two phases of occupation of

[13] Only considering the central courtyard's bins and not storage jars inside the buildings, every household has a storage space of approximately $5m^3$, i.e. an average cereal content of 4,000kg per year per family. Based on a large number of ethnographic, archaeological and historical studies, Korfmann argues that a family of 5 people would have required some 1,400-1,600kg of cereals when complemented with a small meat dietary intake, thus suggesting that the Demircihöyük community was storing an amount of cereals more than double their internal consumption (Korfmann 1983:218-219).

[14] Fire conflagrations in phases E_1 and E_2 seem separated by a very short time span, and when the second occurred the inhabitants still had not completely rebuilt the settlement (Korfmann 1983:28).

the necropolis (early and late) based on associated items and/or stratigraphic relations (Massa 2008). The burial ground does not have an organised plan,[15] but later graves tend to cut previous ones and are possibly located around earlier clusters of burials. Within the same chronological horizon, different grave forms (jars/pithoi, pits, stone-lined pits with a wooden roof and stone cists) are employed to bury the deceased, a custom that has close parallels across the whole central plateau (section 7.1.4). Apart from babies and stillborns buried within the settlement under the houses, all age/gender classes seem to be evenly represented in the cemetery (Wittwer Backofen 2000). The deceased are often interred with small items, mostly pottery and small jewellery: on average one object per interment, although some variability in number and quality of artefacts associated with a burial can be detected.

4.1.3 Social organisation at Demircihöyük

Judging by extent of the living spaces (c.50m^2 per house), the size of "sleeping benches" inside the houses and the reconstruction of the whole settlement based on the half that was excavated, the Demircihöyük settlement was probably inhabited by c.100-130 people at any one time (Korfmann 1983:216-217). What is most striking about the village is the sense of strong communality that emerges from the analysis of the dataset. Despite the fact that most households seem to have been self-sufficient in their primary needs (there is evidence of individual pottery production, as well as knapping, spinning and weaving, ground stone tool manufacture and harvest tools), most activities would have been performed in the central courtyard or in the front rooms, visible to everybody. The common middle space is also where the large storage facilities are kept, suggesting shared control of the (agricultural?) wealth. The party walls between the houses meant that probably repair and reconstruction works had to take place simultaneously and communally at least within the same block of houses, a hypothesis suggested also by the striking continuity in plan, size and location of the buildings throughout the 16 architectural phases (Korfmann 1983:243). Furthermore, the construction and maintenance of the fortification wall must have been another collective effort, and may have possibly been planned and directed by a leader of the community.

The results coming from the analysis on the necropolis, while agreeing with the picture coming out of the settlement, allow for a deeper insight on some of the social dynamics present in the village. When considering the association of age/gender of the deceased with burial forms, diversity of grave goods, presence of particular object assemblages and concentration of metal

[15] As for example at nearby Küçükhöyük, where graves are roughly aligned in rows and are constrained by a perimetre wall (Gürkan and Seeher 1991).

(arguably the main index for wealth in this period), it seems clear that there are some important differences in how different members of the community are treated in their funerary ceremony. In particular, substantial horizontal variations (i.e. related to ascribed status) can be detected with regard to age classes: at the lowest end of the spectrum, stillborns and babies are rarely if ever accorded burial in the extramural necropolis and are instead interred under the floors of the houses without any grave goods or containers, a pattern discernible at most EBA Anatolian sites elsewhere (Massa and Şahoğlu 2011:165). Children (1-11 years) are always buried in small jars,[16] and 45% of them do not have any archaeologically-recoverable grave goods.[17] Juveniles (11-17 years) are sometimes interred in jars, sometimes in simple pits. Older adults, on the other hand, are much more likely to be buried in stone cists, stone-lined pits or large pithoi (arguably more energy-expensive) and tend to have more grave goods, especially precious metals (figs.4.5-6). While gender seems to be a less important variable for differentiation in the cemetery overall, the wealthiest graves belong predominantly to adult males. Furthermore, specific sets of objects can be associated exclusively or predominantly with certain age or gender categories, a pattern that has close parallels at Karataş (Alpers-Bordaz 1978:table VII): small children (1-6 years of age) are associated with rattles, feeding bottles, clay or marble figurines and certain types of jewellery. Adult males have overall associations with weaponry and razors, while adult females are significantly associated only with metal hair-rings (so defined based on their position near the skull of the deceased). As already suggested by Lawrence Angel for the Karataş necropolis (1976:387), it is possible to surmise that major changes in how individuals were buried may be a reflection of specific rites of passage that defined the position of a person within the larger community, and apparently roughly set at c.1 year of age and at c.11-12 years of age.

On a smaller scale, also some vertical differences (i.e. related to achieved status) can be identified: the most evident is represented by eight stone-built graves associated with cattle burials and presence (in three of them) of copper knobbed maces, and tentatively associated with individuals of high status (fig.4.7). These graves are among the biggest of the whole necropolis and, in each case, a couple of bovines is interred in front of the burial, probably killed on the spot and not dismembered (Seeher 2000:31). This ritual has close comparison with several sites within the Kızılırmak bend and that seems associated with individuals of high rank (e.g. in the "Royal" cemetery of Alacahöyük and the Resuloğlu necropolis, fig.4.8). The copper/bronze knobbed maces have also good parallels at sites farther east, primarily with

[16] The few children buried in cists or pits (figure 4.5) are always in the same grave with an adult, a woman in most cases.

[17] Items in perishable materials such wooden objects, flowers and clothing may well have been deposited in the graves but are no longer identifiable.

Alacahöyük's grave B where an almost exact copy in gold is associated with a male body, six bovines and a large panoply of precious items (Zimmermann 2006c:342), thus again suggesting an association of these objects with high-ranked individuals. The eight people buried in the Demircihöyük necropolis can therefore plausibly be identified as the possible leaders of the community (approximately one leader every 15-20 years when considering the time span of the necropolis).

Another group of graves that might shed light on vertical differentiations is represented by men associated with weapons (c.10-15% of the total adult male population): while generally not differing from other interments in terms of wealth and grave types, the fact that their community chose to bury them with weapons suggests that participation in warfare may have been a defining trait in the social identity of certain people at Demircihöyük, important enough to be a prominent characteristic in the funerary display. Weapon injuries on the skulls and arms of five adult males (three of which also have weapons, Wittwer Backofen 2000:272) further suggest that daggers, maces and hammer-axes were not simply symbolic but were actually used in battle.

It is also interesting that working tools (e.g. stone hammers, hatchets, spindle whorls and copper needles) are sometimes deposited with the interments: this suggests that a person's occupation in life may have to some extent contributed in creating a social identity at least during his/her funerary display. While at the moment speculative, this trend is a plausible hint that some degree of craft specialisation may have been in place also in Demircihöyük. When compared to the Karataş dataset, the two funerary contexts have approximately the same mean ratio of metal objects per individual (0.4-0.44 item/person), but in Demircihöyük they are more equally distributed across the graves and there are no outstanding concentrations of wealth, possibly a reflection of the different sizes of the two communities (c.400-600 people at Karataş, c.100-130 at Demircihöyük).

To conclude, social differences between the inhabitants of the village are probably largely based on their age, and in some cases on their occupation; the local leaders of the community, whose graves are by no means wealthier than the average, possibly had the role of regulating the internal life cycle of the village, perhaps deciding building activities and agricultural tasks, and may have had a part as intermediaries with other communities.

4.1.4 Demircihöyük and its wider environment

The site of Demircihöyük sits by a stream on the outskirts of the Eskişehir plain and only a few kilometres away from highlands to the north and the south (figs.4.1-2), thus at walking distance from both agricultural fields and possible upland pasture. Zooarchaeological analysis suggests that hunting partly contributed to the diet of the community (wild game represents c.6% of the total bone assemblage, Driesch and Boessneck 1987). The region around Demircihöyük is also very rich in natural resources, and detailed geological research has detected potential mineral sources for at least some of the ground and chipped stone implements found on site, in a range between 1 and 40km (fig.4.9, Bachmann and Weiner 1987). Further away still (90-150km south of Demircihöyük) there are several marble quarries known to have been exploited in Classical times and are the closest and most probable source for the several marble figurines found in the necropolis. Lastly, the silver/copper mine of Gümüşköy[18] and the copper smelting site of Tepecik (associated with early EBA pottery, Efe 2002:54), c.70-100km away, are likely sources for at least some of the copper and silver objects found at Demircihöyük.

How can we envisage these different materials arriving at the site? For the ground stone implements, there is evidence of production within the settlement (e.g. the retrieval of an unfinished macehead, Obladen-Kauder 1996:pl.83), suggesting that stone would have been brought in as roughly shaped-out blanks and later finished at the site. This however does not exclude the possibility that some of the more elaborate types (e.g. hammer-axes) may have been made elsewhere and then exchanged as finished products. There is also abundant evidence that flint, at least the most common varieties, arrived on site in form of cores and may have been subsequently knapped locally (Baykal-Seeher 1996a:330-332). On the other hand, substantial evidence about specialised metallurgical workshops elsewhere and different stages of metal extraction and refinement (section 6.2.6) suggests that metal was most probably travelling as finished product either in its definitive form or as blank shape to be re-melted and re-worked locally (e.g. flat axe or rod ingot). In particular, some of the objects found in the Demircihöyük necropolis reveal complex manufacturing techniques (e.g. bi-valve casting or lost wax) and are most probably the product of specialised workers located at larger centres elsewhere. In the case of the marble figurines, they most probably arrived as finished objects from the Afyon area (section 7.1.1).

One also has to address the issue of whether materials were brought to the site through direct or indirect procurement. Empirically, it is possible to imagine that the direct procurement zone must have varied according to value and weight/volume of the desired material: in case of building materials, this is likely not to have extended farther than a few kilometres, while for more desirable serpentinite, basalt, flint and chalcedony might have come from up to 30-40km away (2-3 days walk for the return trip). For resources further away, intermediaries may have

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[18] Two charcoal samples provide dates of c.2500-2200 and 2200-2000 cal BC (Wagner and Öztunalı 2000:38). The published uncalibrated dates are, respectively, 3700±65 BP and 3900±85 BP and have been calibrated using CALPAL software (www.calpal-online.de).

been responsible for the arrival of these materials to site. This becomes almost obvious when considering that the landscape around Demircihöyük, especially the plain, was densely populated with other villages and towns in the mid-3rd millennium (figure 4.1). The results of an extensive survey show that within a 10km radius from Demircihöyük there were at least six contemporary sites during the c.2700-2400 BC period, between 0.7 and 2.5ha (Efe 1990, 1995). This is almost surely a gross underestimation (section 1.7.2), but even with these data it is clear that the smaller-than-average Demircihöyük community was inserted in a rich local network made up of villages typically comprising some 200-800 people each. Moving through this network most probably involved some sort of social negotiation in order to pass through another community's land, and it is possible that the sources of raw materials (at least the more valuable ones) were under the control of a nearby group, that may thus have had some rights over their exploitation.

Within this context, it seems also useful to point out that, simply by looking at the size of the surveyed mounds, there is a clear hierarchy of sites in the area, with big sites in the middle of the valley strung-up along the modern Bursa-Eskisehir-Ankara road, which was also the main Roman road and possibly an important EBA route (fig.4.1; section 3.2.3). In particular, the large settlements of Bahçehisar (c.10ha) and Şarhöyük (c.15ha) are only 16km and 23km away from Demircihöyük respectively, thus broadly within a day’s walk. Excavations at Küllüoba (c.5ha) and Seyitömer Höyük (c.2ha) also revealed clearly identifiable public buildings embedded in much larger domestic areas (Bilgen 2011; Efe and Fidan 2008), associated with luxury objects and evidence of long-distance trade. This suggests the presence of stable elites even at medium-sized settlements and hints for the existence of a complex network of political relationships within the Eskişehir and Upper Sakarya plains, a topic which unfortunately remains little investigated in the area and in the rest of EBA western and central Anatolia. In virtue of its size, its internal structures and its findings, it seems however clear that Demircihöyük (0.35ha) is in the lower echelon of the regional settlement hierarchy.

What was the relationship between Demircihöyük and the bigger nearby sites? We have here no direct evidence of territorial control during the EBA, but in contemporary Beycesultan plain there is evidence of short-lived small fortified sites situated at the entrance to the valley and next to water fords, and several large (20ha+) settlements at the centre of the system (fig.1.18, Abay 2011). It is plausible, although not provable, the existence of similar arrangements in the Eskişehir region as well. The leaders identified in the cemetery may have acted as intermediaries between the village and the other groups in the valley, although again this is a speculation. If Korfmann is correct, and Demircihöyük was storing large agricultural surplus, what was the final aim of this strategy? Was it saved for dry years? Was it used to exchange it with raw materials/finished objects? Was it sent, at least in part and under duress or not, to larger non self-sufficient centres? While there is not yet a clear answer for these questions, there is more solid evidence that Demircihöyük was involved in some sort of dispute that resulted in one or more episodes of violence, as detectable both from settlement and funerary contexts. Fortifications, settlement destructions, deposition of weaponry in the graves and weapon injuries are common traits across Anatolia during the later part of the EBA and suggest that warfare is an increasingly frequent medium of interaction and dispute resolution between neighbouring communities (Massa 2014a), as certainly is the case for Demircihöyük.

4.1.5 The participation of Demircihöyük in the interregional exchange networks

The earliest evidence of long-distance contacts is represented by an ovoid clay bulla with cylinder seal impressions (fig.4.10c, Obladen-Kauder 1996:286), possibly clasping a small container or a bundle of objects and almost certainly of Mesopotamian origin (section5.2.2.3). It was found in a mudbrick bin of the central courtyard, in a phase F_2 context (c.2800 cal BC) and in a very secure stratigraphic context (Korfmann 1983:67-68), making it the earliest documented Mesopotamian import in the whole of western and central Anatolia. Other evidence of long-distance contacts is represented by the tin bronze objects from the necropolis (40% of the total analysed artefacts, Pernicka 2000:232-235). Although the origin of the tin is highly debated, there seems to be a consensus that it came from further east (either the Taurus Mountains or western Iran/Afghanistan), i.e. in the range of 450-2,000km away from Demircihöyük as the crow flies. From the necropolis there are other two object types that seem to point to connections with the southern central plateau or beyond: the first is a single crescent-shaped axe (figure 4.10a) found in grave 100 in association with pottery from phases K-L (Seeher 2000:36), i.e. c.2700-2650 BC. The form has been described as typical of northern Syria (Gernez 2008:177). The second type comprises the so-called lead bottles (figure 4.10b), small containers probably for perfume or other valuable liquids. They are found in high numbers in the Demircihöyük graves (32 specimens) and are also present in smaller numbers at nearby Küçükhöyük (Gürkan and Seeher 1991). Their shape does not resemble any known clay counterpart in the area, and are probably a local re-elaboration of the well-known "Syrian bottle" of northern Mesopotamian origin (section 7.2.3.1). Of the 32 lead bottles, two are associated with finely dateable clay vessels (in G.100 and 141) belonging to the early phase of the necropolis (levels L-M-N, Seeher 2000), i.e. between c.2700 and 2600 BC.

As a last remark, analysing the objects from the graveyard that can be finely dated through pottery association it is possible to clearly detect an increasing influx of wealth at Demircihöyük throughout time: for instance, the burials belonging to the later phase (c.2600-2500 BC) have on average a higher number of objects and a higher number of metal items than those in the early phase (c.2700-2600 BC). More interestingly, gold items are almost exclusively found in the later phase, and in particular the diadems are more likely to be made in copper-based alloys during the first part of the necropolis' use and in gold during the second part (fig.4.11). Given that the closest sources of gold are probably the Troad or the central eastern Aegean coast (250-300km away), this trend suggests that the area around Demircihöyük gets increasingly integrated in wider exchange networks towards the mid-3rd millennium.

4.2 Karataş

Karataş is located in the middle of the Gölova plain, a narrow valley in the Lycian highlands, south-western Anatolia (fig.4.12). It extends over at least 20ha, and is comprised of different areas: a) Bağbaşı, a spur overlooking the valley, b) a small mound roughly 70m in diameter whose investigation revealed what the excavators called the Central Complex, c) nuclei of several separated flat settlements surrounding the mound and d) various burial grounds (fig.4.13). The main occupation period documented at the site is the EBA (phases I through VI, c.2800-2350 BC), although Chalcolithic, MBA and early Iron Age occupation remains are found as well, thereby documenting activity across more than four millennia (c.5000-800 BC). The site has been extensively published, either in the form of final reports (Eslick 1992, 2009; Warner 1994), thorough preliminary reports of the archaeological, anthropological and zooarchaeological remains (Angel 1976; Angel and Bisel 1986; Hesse and Perkins 1974; Mellink 1964, 1965, 1967, 1969a, 1969b, 1971, 1972; Mellink and Angel 1966, 1968, 1970, 1973; Stech-Wheeler 1974), by an unpublished PhD dissertation on the analysis of metal finds (Alpers-Bordaz 1978), an unpublished BA dissertation on the textile industry (Cannon 2010) and a brief overall reassessment of the site (Yakar 1998). While representing a very well-published dataset with in-depth analysis of the individual finds that allows the detailed re-examination presented below, there has been little attempt (with the notable exclusion of Yakar 1998) to create a synthetic perspective of the site in its entirety, to analyse the relationship between the different components of the site, the socio-economic dynamics that may be behind the archaeological finds, and the relationship between Karataş and neighbouring communities. My intended contribution is therefore to provide such a framework of analysis focusing on the EBA material evidence on site, similarly to what already carried out for Demircihöyük.

4.2.1 The site

The character of Karataş is somewhat special in the panorama of EBA western Anatolian sites for several reasons:

a) the use of wattle-and-daub architecture and consequent flimsiness of the buildings (with the exclusion of the Central Complex), that contrast with the normative stone-and-mudbrick architecture of lowland sites;

b) the free-standing nature of the buildings, which starkly contrasts with the agglutinated plan of all known western Anatolian lowland sites. This feature largely prevented the formation of a multilayered man-made mound (höyük), with the exclusion of the Central Complex that is the only structure with significant re-building activities on the same spot. It also implies relatively low-density occupation of the settlement, with an estimated 100-150 people/ha (Warner 1994:175-177) versus an average of 250-400 people/ha in mounded settlements like Demircihöyük (Korfmann 1983:216-217);

c) the absence of substantial residential units outside the Central Complex in phases I-IV, c.200 years (fig.4.14);

d) the shifting of settlement nuclei across the occupation phases V:1-VI:2 and paralleled by the shifting of the burial grounds (fig.4.14);

e) the zone of respect (c.100m) that all settlement nuclei kept from the Central Complex throughout the c.500 years of EBA occupation (fig.4.14).

Some of these elements were already noticed by Yakar who thus suggested the possibility that a part of the Karataş community outside the Central Complex may have followed a semi-sedentary life-style and been present on site only seasonally (1998), a hypothesis that will be further explored below. The history of the EBA settlement of Karataş can be divided in two main periods. The first (phases I-IV, c.2800-2600 BC) is characterised by the construction and development of the Central Complex, a fortified structure (c.50m in diameter) that in time extended to comprise several buildings and structures outside the fortification, and that judging from the size and internal arrangement of the structures hosted some 50-70 people. Contemporary to it, there is very little evidence for a surrounding settlement, with the exclusion of a house in the north-western part during period III and possibly some buildings in the south-west during phases I-II. There are also small burial grounds (for a total of c.150-200 estimated graves) in the south-west and north-west. Notwithstanding the possibility that erosion may have obliterated archaeological evidence in the western portion of the site (Mellink 1965:243; Warner 1994:5), the available evidence suggests that the Central Complex may have been the only permanent structure on site during the early period. A fire conflagration destroyed all the structures in the mound and the south-western outskirts at the end of period II (c.2800-2700 cal BC, Warner 1994:10).

The second period (phases V:1-VI:2, c.2600-2300 BC) sees the appearance of substantial nuclei of settlement clearly separated one from the other; in some cases they seem more permanent, in others are short-lived. They possibly extended beyond the excavated trenches, so an estimate of c.3ha of aggregated settled area (some 300-450 people) in any sub-phase is perhaps too low. At the same time there is a considerable expansion of the burial grounds: while the exact dates of each necropolis are at the moment unknown, the vast majority of the excavated burials seem to belong to the later period, and between 1,700-3,500 burials can be estimated,[19] a number that thus plausibly includes all the inhabitants of the site over a period of c.250-300 years. During the later phases, the Central Complex is scantily known since the erosion obliterated the upper levels. Available evidence for the outskirts of the mound however suggests that it was still in use and may have continued its role as a focal place for the Karataş community. Two fire conflagrations (period V:1/2 and VI:2) destroyed all the standing structures, and the latter likely ended the EBA occupation at the site.

4.2.2 Production activities

Flint blades, in many cases probably associated with a sickle-blade industry,[20] represent 65% of the chipped stone industry and are found everywhere on site (fig.4.15a), hinting that agricultural production may have been an important component of the economic strategy at Karataş during the EBA as it was also already in the LCh (cf. Eslick 1992:49). Interestingly, cores (20% of total sample) are only found in the south-eastern slopes of the mound and the south-eastern neighbourhood, suggesting that blade production may have been restricted to this area only.

There is also substantial evidence that liquid and solid foods were stored on site due to the retrieval of large numbers of plaster-lined pits, a wide range of storage jars and a number of wooden sheds or annexes everywhere at the site (Warner 1994:181-184). The finding of grinding implements in all best-preserved trenches (fig.4.15b) also shows that cereals were processed in loco. Interestingly, over 100 specimens (c.60% of the total) are found in a very

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[19] Reconstruction of the extent of different nuclei was performed employing available evidence from published reports (mainly Warner 1994). Density of graves was calculated taking into account the excavated area and the number of retrieved graves, and the number of burials per grave was estimated by Angel and Bisel 1986.

[20] Detailed analysis of the chipped stone for the EBA settlement was not provided, but 30% of LCh assemblages at Bağbaşı were sickle blades (Eslick 1992:37-38). Analysis at other western Anatolian sites showed that a large proportion of chipped industry during the EBA belongs to sickle blades (cf. Gatsov and Karimali 2007).

small area south-east of the mound belonging to phase V:1/2, close to the paved ramp accessing the Central Complex and associated with a battery of kitchen ovens and storage jars (Warner 1994:121-122).

Over 100 spindle whorls and 40 loomweights have been retrieved from phases IV-VI throughout the site (fig.4.15c) and a substantial number of specimens is also found in the Central Complex during periods I-II (Mellink 1967:264; Mellink and Angel 1966:250; 1970:250), suggesting that spinning and weaving may have been a common activity carried out at the household level. The importance of a textile industry at the site is partially confirmed by the preliminary zooarchaeological analyses showing that sheep/goat represented the majority of the animal consumed at Karataş (75% of the total number of individuals, and 48% in terms of meat) and that c.60% of sheep/goats were kept until maturity (Hesse and Perkins 1974). These results made the analysts suggest a focus on meat, but could equally fit exploitation of secondary products including wool (Cannon 2010:15). In absence of comparative studies with other sites, it is difficult to assess whether this production served only the needs of the Karataş community or was directed for exchange with neighbouring communities. On the other hand, clay stamps probably used in the decoration of cloth[21] and clay brushes are only found in the mound itself (periods I-IV) and the south-eastern settlement (periods V-VI), suggesting that some stages of the textile production may have been restricted to this area.

Furthermore, some 30 stone weapons (hammer-axes and maces) have been found in various degrees of completeness, mainly belonging to periods V-VI. Specimens with signs of being left unfinished at different stages of production are only found in the south-east, suggesting that production of stone tools was restricted to this area (fig.4.15d).

Additionally, the lack of standardisation, handmade production and clear differences in decoration that could be tied to individual trenches/buildings suggest that the bulk of the domestic pottery assemblage was produced at the household level throughout the EBA occupation (Eslick 2009:229-230). On the other hand, production of large pithoi (up to 2m in height and 1.5m in width) used for burial is most probably the work of a specialised potter (Warner 1994:181), and a hint of this is given by the only kiln (c.3.2m diameter) found on site (fig.4.16a). There is however a category of pottery that may have been brought to the site from nearby settlements: wheelmade products, which Eslick considers as being imported from a nearby production centre based on fabric composition (2009:231-232). This class is represented mostly by plates with some drinking vessels (tankards and depa) and a few jars and jugs, all of which are also represented in the local handmade repertoire. While a ratio between wheel- and

[21] For the discussion on the function of the EBA Anatolian clay "stamp seals" see section 5.2.2. These objects are, in all best-known contexts, closely associated with textile production.

hand-made pottery is not provided in the publications, a considerable amount of wheelmade pottery may have been present, in the range of c.10-15% for phase VI,[22] and is fairly widely distributed across the site and present in most households (fig.4.16b). This pattern suggests that, at least in Karataş, wheelmade pottery and the typical late EBA drinking set are not restricted to elite contexts.

Finally, there is a complete lack of evidence for the local production of metal objects at Karataş, despite over 300 copper, silver and gold items. Although only c.7% of the total area of the site has been excavated, 125 trenches cover most of the site's extent and, if a metallurgical activity had taken place in Karataş, some evidence would have most probably surfaced. Metallurgical analysis performed by Alpers-Bordaz reveals that, while many objects are manufactured with very simple production techniques (from metal sheet or wire), many others are cast with bivalve moulds and a few may have been produced with lost wax technique (1978:13-21) hinting that at least in the latter cases they may have been produced by metal smiths outside Karataş.

The evidence so far presented suggests that at Karataş the main socio-economic unit was the household and it was here that most basic subsistence tasks were performed: harvesting, food preparation, pottery and textile production. Interestingly, food storage also seems to have been dispersed rather than concentrated in communal areas (unlike at Demircihöyük). However, clear differences can be made between the different settlement nuclei, with some of the activities concentrated in the south-eastern neighbourhood and on the mound: flint knapping, ground stone tool manufacture, textile decoration, and possibly specialised pithos production. It can thus be envisaged that very localised exchanges between the different settlement nuclei may have been common, with one area providing some finished artefacts and another providing goods that remain invisible in the archaeological record (e.g. animal stock or agricultural produce). Metal artefacts and wheelmade pottery were plausibly imported at the site from nearby settlements.

The presence of two distinct nuclei of habitation (in the north-west and the south-east), the clear differences between them, the overall sparse settlement layout, the occurrence of more ephemeral aggregations of houses from time to time and the distance kept from the mound all seem to corroborate Yakar's idea that a component of the Karataş community was not fully sedentary. This is further hinted by the overlap between settlement and burial areas in different periods: in several instances graves are put into the ruins of earlier houses, and in one occasion

[22] Phase VI is marked by the first appearance of wheelmade pottery. Note that the pottery from the cemeteries has so far not been published to any degree, and that Eslick's work by her own admission is skewed towards whole pots, thus excluding the large number of wheelmade fragments mentioned in Warner's publication of the settlement (1994:13-134).

(in tr.35/37) houses from phase V:3 are built on top of earlier (phase IV-V:1) burials, suggesting that the boundaries of the living area were not as well defined as in most other contemporary settlements in west/central Anatolia. If we combine these data with the fact that the site is, for c.200 years, essentially composed of the central mound and a few flimsy buildings scattered around, the overall impression we get is of a very unusual site compared with the more general picture of the EBA in Anatolia and that, in the beginning, it was probably not a settlement in the real sense of the term but rather a gathering place. The next section will try to analyse in more detail the public places of Karataş in order to understand the function of the Central Complex and of House 63 as possible locations for public gatherings.

4.2.3 Elite buildings and public gatherings

The Central Complex is the only structure that was permanently present at Karataş for the whole period of EBA occupation, in fact the only substantial building from phases I through IV early (fig.4.17). While its shape changes and its size grew bigger across time, its character as elite residence probably remained constant. In phases I-II, the only ones where the complete layout is preserved,[23] the complex seems to have been composed of two main bodies: the inner part had a main room with an underground storage space (large pits) and at least one other wooden floor (hinted by traces of postholes and a staircase structure). It was further surrounded by a covered courtyard and encircled by a strong (3.5m thick) fortification, whose entrance was guarded by a small room (the "eastern tower", fig.4.17a). The plan is unique for the whole of EBA west and central Anatolia, and gives the impression of a sturdy building whose access is highly restricted. The outer part was composed of small rooms whose external walls were bonded into a circular wooden palisade. Mellink thought of them as houses (they are equipped with platforms, hearths and bins), and suggested they may have belonged to the "retainers" of the inhabitants of the mansion (Mellink 1974). Outside the palisade but clearly connected with the Central Complex there were two small (2m diameter) circular semi-interred huts with plastered floors, benches, hearths and a central posthole that suggests a pitched roof (fig.4.17a). While Warner described them as "habitations" (1994:123-124), they seem extremely small ($3m^2$!) and are again unique among EBA Anatolian domestic buildings. Very tentatively, they might be re-identified as sweat lodges, a character that would explain the size, the semi-underground nature, and the existence of benches and hearths.

[23] The upper layers of the mound were badly eroded with the result that from phase III onward the central structure is unknown.

In the rubble of the destruction of phase II, a large number of clay brushes, spindle whorls, loomweights and clay stamps indicate substantial textile activity inside the complex, possibly located within the inner courtyard. In later phases, the space outside the Central Complex had most probably been employed for public events, possibly rituals or social gatherings, as witnessed by several features. In level III early, two parallel ditches were dug in front of the gate (fig.4.17b). Their non-defensive function is stressed by the presence of two small decorated hearths at the eastern ends of the ditches, and the fact that they did not enclose the Central Complex but were rather laid in straight lines (Warner 1994:122-123). Towards the end of phase III, several large (up to 8m diameter) open fireplaces were installed on the south-eastern slopes of the mound together with two trapezoidal clay platforms (c.3x3.5m in size, fig.4.17c), and continued to be used until phase IV early (c.50-100 years). These structures were associated with heaps of ashes deposited in numerous distinct episodes, and within the ashes there was a large number of animal bones, some chipped flints and some spit supports (Warner 1994:122). The whole set suggests cooking of meat for a large gathering, possibly in connection with some ritual whose details escape archaeological visibility. In the mature phase IV, the area was turned into a residential quarter in close connection with the Central Complex, with houses only 15-20m from the fortification gate, and better-built than their counterparts in the main settlement nuclei (fig.4.17d). Inside these buildings, a number of luxury items were found (see below), together with evidence for several production activities (ground stone industry, chipped stone industry, antler working, textile industry). In the last documented level (phase V:1/2) a paved ramp leading to the Central Complex was built; on its sides a battery of eight kitchen ovens, storage jars, storage sheds and a large number of grinding stones were found (fig.4.17e), again suggesting food preparation for a large number of people, in connection with the mansion. The available evidence thus suggests that the Central Complex served different functions: as the residence of the Karataş leader (whose existence is also hinted by grave AQ 367, see below), as a production centre via its subsidiary areas and buildings, and as a catalyst for large gatherings that included meat and bread consumption.

House 63, on the other hand, had been erected in the south-eastern neighbourhood (fig.4.18) some time after the fire conflagration of period V:2,[24] after the cessation of any evidence of activity in the outskirts of the mound. This building was the by far the biggest of the whole Karataş village, with sturdy, finely-built walls at least 18x10m long (but probably even longer). At the centre of it, there was a small rectangular "kiosk" (1.5x2m) made of stone slabs, and no further internal partitions that are the norm in Karataş' domestic buildings. While the deposits in

[24] While not precisely dated by Warner, she mentions that the foundations of House 63 and the "Kiosk" were on top of an extensive burnt layer from phase V (1994:71), and because this burnt level appears everywhere on site and can be precisely dated to V:2, the structure in discussion can be securely dated after this event.

this trench were badly disturbed and it is difficult to assess both a direct association between the house and the kiosk and their possible function, a very peculiar vessel was found inside the kiosk, a large decorated four-spouted crater with the capacity of c.30 litres, without precise parallels in EBA Anatolia (fig.4.18b, Mellink 1969b:69-70). According to Mellink, the spouts were most probably used to insert sipping tubes rather than to pour out the liquid content, as depicted on EBA Mesopotamian drinking scenes involving very similar vessels. She further suggests that the beverage may have been alcoholic, again comparing with better-known Mesopotamian contexts (Mellink 1969b:71-74). Based on its size, the presence of the "kiosk" and the decorated krater, House 63 can tentatively be identified as a place of gathering for a large number of people, during an event that possibly involved drinking an alcoholic beverage. On this subject, it is here worth mentioning that a large number of unusual vessels often thought to be connected with alcoholic drinking (depa and tankards, cf. section 7.2.3.6) have been found throughout the settlement (fig.4.16b) and in several graves. This suggests that they were possessed by individual households rather than distributed during public events and that participation in these gatherings likely involved most or all the households in Karataş. This hypothesis is strengthened by the fact that, with an area of at least 200m^2, House 63 could have potentially accommodated most or all of the adults in Karataş (some 150-250 people). Unfortunately, given the erosion of the uppermost levels of the mound, the relationship between House 63 and the Central Complex cannot be established, nor can we speculate about whether the two places of gathering may have been in use at the same time for different events, or instead House 63 was the sole public place in phases V:3 and VI:1/2.

4.2.4 Luxury items, exotica

The concentration of valuable items (e.g. metal or marble objects, or items that are clearly imported on site) within both the habitation areas and the graveyards will now be analysed, in order to highlight potential social differences and differential access to luxury resources among the various segments of the Karataş community. When considering the settlements, it can be seen that copper implements (essentially small jewellery and tools) are equally distributed across the different trenches (fig.4.16c), suggesting that in the later 3rd millennium copper objects were a widespread commodity and that, at least in Karataş, were part of the normal domestic repertoire. On the other hand, all three silver artefacts (a pin, a pin with a cast wild boar's head, and a miniature double-axe) were found on the mound, and so was a container sealing of possible Aegean provenance (section 5.2.2.3), a decorated limestone hammer-axe and a marine shell of *Charonia variegata*[25] (figs.4.16d, 4.19).

While the various burial grounds have so far not been published in detail, Alpers-Bordaz performed a distribution analysis of the metal artefacts employing different indices to measure relative wealth between the different cemetery areas (1978:262-278). For each area she calculated the ratio of graves with metal in respect to the total of the trench, the diversity index (how many types of objects present in each trench), the number of metal objects per number of graves, and the percentage of gold/silver objects present in each trench in respect to the total. Her results clearly show that trench 98 has the highest ratio of tombs with metal, has most of the gold and silver artefacts (96% and 85% respectively) and higher than average amount of copper (40% of total number of artefacts, while tr.98 has only 26% of total number of graves, fig.4.20). All other areas return lower scores and, in particular, there is very little or no silver and gold elsewhere (fig.4.21). The differences in metal wealth can be to some extent correlated with different chronology (tr.98 bearing some of the latest tombs, and trench 35/37 all of the earliest), but areas like tr.98, "Main Cemetery", "SE Cemetery" and trench 7/12 are roughly contemporary and yet there are big differences. In particular, the area where the main necropolis seems to have been located in periods V:1 through V:3 also shows considerable internal differences, with trenches 98 and 7/12 being the two wealthiest and the "Main Cemetery" trench being among the poorest. It is important to note that trench 98 is the cemetery area closest to the Central Complex, and that it contains the peculiar grave AQ 367, strikingly different from all other burials in Karataş. It is a small tumulus (6m diameter) ringed by a stone perimeter and packed with smaller stones and soil, covering a 2.5x2.5m stone-lined pit protected by a limestone slab; inside lay the remains of an elder adult in secondary burial, with only some of the bones selected and disposed in a non-anatomical position (Mellink 1969a:324-327). In contrast, the over 600 graves excavated at Karataş are all jars or pithoi, and contain remains of deceased in anatomical connection (i.e. they all seem to have been buried and not further manipulated). Further, immediately south of AQ 367 there are the two wealthiest graves of the cemetery (G.357 and G.359), a child and a young female with a total of c.650 beads in silver, copper and gold forming a headdress, two gold ear studs each, four copper and silver bracelets and one gold pendant. For its peculiar burial practices and proximity of other wealthy graves, Mellink suggests that AQ 367 may have been the grave of an important member of the society, probably connected with the Central Complex (1969a:327).

The overall impression, even though the data have only partially published, is that there is a clear clustering of wealth (measured in terms of presence and quantity of exotic objects and

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[25] I would like to thank Daniella Bar-Yosef Mayer for the identification of the shell species.

precious metal) detectable in settlement and the necropolis contexts alike, with the Central Complex on the one side and trench 98 on the other being the places with the highest concentration of wealth. This pattern suggests the presence of a social segment of the Karataş community with preferential access to metal and exotica, and that this group may have resided in the fortified mansion on the mound.

4.2.5 The human and natural landscapes of Karataş

Karataş lies within a valley system comprised of the Gölova and Elmalı plains (c.450km^2), surrounded by high mountain ranges on all sides and rather isolated; there are only a few access points to the system that are marked today as in antiquity by the path of the main roads (fig.4.12). Highland pastures are very close (5-10km away), and fertile agricultural soil is present everywhere around the site. Forests are also near, though the preliminary report of palaeo-faunal remains suggests a minimal exploitation of wild game by the inhabitants of Karataş, essentially restricted to deer antlers (Hesse and Perkins 1974).

We have only a blurry and partial picture of the EBA settlement network, since the surveys by Matchteld Mellink and James Mellaart were extensive in nature (Eslick 1992:xvii-xviii; Warner 1994:2-3) while Pedar Foss' survey was intensive but focused in the southern valley and not fully published (2001, 2006). It is however clear that Karataş (0.4ha of mound) is a relatively small site in comparison with its neighbours when looking at the dimensions of the mounds.[26] Around the mid-3rd millennium, the site had at least six other settlements in a radius of 10km, and therefore an intense interaction with them and with the whole valley system has to be imagined, since the farthest site to the south is only 35km away. Especially in the Elmalı plain, some 20-25km south of Karataş following the main road, there are two much bigger settlements, namely Yaka Çiftliği at 4.5ha and Hacımusalar at 18ha (Foss 2006). The size of Hacımusalar and its position in the middle of the plain suggest that it may have been a central place already during the 3rd millennium, possibly controlling at least the Elmalı plain. Foss' survey further identified several small EBA settlements at the edges of the basin and in correspondence of the main accesses that bore evidence of Iron Age fortification walls (Foss 2006). While he does not speculate on their function during the 3rd millennium, it is feasible that these sites may have guarded the entrance to the valleys and that a rudimentary form of territorial control might have been already in place, possibly favoured by the small size of the plain and the ease in controlling its accesses. Like in Demircihöyük, also in Karataş there is compelling evidence for warfare: as already mentioned, the site experienced a fire conflagration

[26] Mounds are in most cases the only investigated feature of a site and the only measured one.

investing all standing structures in at least three distinct events (phases II, V:2 and VI:2), while weapon injuries in the form of parrying blows on the ulnae and blunt traumas to the head are found on c.10% of adult males with sufficient preserved skeletal remains and a lower percentage of adult females as well (Mellink and Angel 1968:261-262). This suggests that relationships between Karataş and its neighbours were not always peaceful, although it is presently impossible to identify who these enemies may have been.

4.2.6 Karataş and the long-distance exchange networks

As seen earlier, Karataş yields a large number of items that are almost certainly not produced on site. The two marine shells, one from the Central Complex and one from the cemetery, belong to the species *Charonia variegata* and are widely distributed in the Mediterranean Sea; they most probably arrived on site through the Lycian coast, some 65-85km away from Karataş. Wheelmade pottery, while most probably not produced on site, may have come from very close by, potentially any medium/large centre in the valley system. Marble objects are represented by a fair number of figurines found in child graves, all belonging to the same type I.3, the so-called "spade figurine". As the analysis provided in section 7.1.1.2 suggests, this type was probably produced in close proximity to the Afyon, Kütahya and Uşak marble quarries (some 250-300km away from the site), and likely arrived at Karataş only as a finished product (fig.4.22). For the metals, the problem is more complex since, unlike with other materials, metal objects can be re-melted from multiple items and could have circulated for long time before being deposited into an archaeological context, so the question of the origin of the raw material cannot be answered straightforwardly.

What can be said, however, is that metal ores are strikingly scarce in the area around Karataş: the nearest copper sources are 130-250km away, gold sources are some 350km away and silver sources even further at 400km away (fig.4.22). This suggests that metal may have been considered more valuable here than elsewhere in virtue of its perceived rarity. A detailed typological analysis on the metal objects by Alpers-Bordaz indicates that some types can be broadly traced back to western Anatolia (e.g. razors, spatulae, daggers), while others (tubular beads, headdress, head diadems, ear studs, torques) are found across the whole of Anatolia during the late EBA (1978:70-231). There are two small silver objects that however deserve closer inspection: a miniature double-axe and a toggle pin with a boar's head (figs.4.19a,d). The double-axe has its closest parallels with Early Minoan II Mochlos copper and lead double-axe models (Mellink 1967:265), while the pin can be inserted into a tradition of animal-headed pins in northern Syria (Fidan 2013a:7). Finally, the container sealing with curvilinear geometric design (fig.4.19c) has its best parallels with western Aegean specimens (section 5.2.2.3), and was probably attached to a small basket of unknown content.

The data presented above show that, notwithstanding the small size of Karataş and the geographical isolation of the Gölova-Elmalı valley system, the site was to some extent inserted into a regional and supra-regional network of exchanges. It is however worth remembering that all of the gold and silver and most of the other luxury artefacts are concentrated in and around the Central Complex and the "chiefly " grave AQ 367 (in tr.98), thus suggesting that only a small segment of the community had access to these items. On the other hand copper objects, wheelmade pottery and marble figurines are more widespread within the settlement and necropolis, indicating that they may have had a wider circulation and possibly a different network. While it is not possible to reconstruct, through the archaeological evidence, the details of the exchanges and the people involved in them, it seems however feasible to suggest a few points:

a) during the later part of the 3rd millennium, a number of basic commodities (e.g. copper, stone artefacts, some peculiar vessel types) start circulating in large quantities and across increasingly long distances, reaching even those locations like Karataş that were relatively isolated and distant from metal and stone sources. This may indicate a trend towards specialisation in both production and exchange;

b) the end receivers of the majority of these artefacts were probably common individuals that exchanged them through barter. In the case of Karataş, likely goods for the barter may have been agricultural produce, livestock, dairy products, hides/leather and textiles, all more or less invisible at the archaeological level;

c) a small number of prestige items (e.g. the silver/gold headdresses from graves 357 and 359, or the silver boar-headed pin) may have instead been the product of gift exchange between elites, and may have involved specialised craftspeople in their production.

4.3 Discussion

4.3.1 Social interaction at the community level

Despite their small implied populations (c.100-130 individuals for Demircihöyük and c.400-500 people for Karataş), the two communities provide good evidence of a codified internal structure that regulated the mechanisms of interaction between different individuals. Work on the funerary evidence seemed particularly effective in showing that members of the community were treated differently during the burial ceremony according to a number of elements like age, gender, occupation and achieved social status, and possibly others that we are not able to recognise archaeologically. While it is probable that discrepancies between the individual's representation in the burial and their social position among the living may have existed, it still seems very likely that these differences in death broadly reflected differences in life, also in light of direct parallels with the settlement evidence.

In particular, age seems to have been the single most important element in defining the place of an individual within Demircihöyük's and Karataş' communities. It has been earlier suggested that at least two age thresholds may be detected, at c.1 year-old (after which individuals start to be buried into the extramural cemetery) and 11-12 years-old (after which they are associated with different grave and object types). Elderly people are furthermore normally associated with more energy-expensive graves (either larger pithoi or cists/stone-line pits) and with wealthier grave goods. While detailed studies are lacking for other EBA necropoleis, the intramural burial of infants (i.e. <1 year-old) and their association with a specific grave set (small jewellery, feeding bottles, figurines) can be detected throughout Anatolia (Massa and Şahoğlu in press). Very similar patterns can be traced already in the late 4th millennium cemetery of İkiztepe[27] on the Black Sea coast, where quantity and types of objects were clearly correlated with age of the deceased (Wittwer Backofen 1985:177-179).

Gender also seems to have had significant weight in defining social relationships between the inhabitants of these small communities, given that differences were in some cases clearly marked in the funerary record. In Demircihöyük, where a complete osteological analysis is available, males are always laid on the right side of the hocker, while females on their left side (Wittwer Backofen 2000:245). Further, specific types of goods are exclusively or prevalently associated with adult men or adult women, and most of the wealthier graves belong to men (possibly including all of the "chiefly burials", Massa 2014b). Again, İkiztepe provides for the moment the earliest proof of such trend in Anatolia, with wealthiest graves all belonging to adult males and specific objects more tightly associated with either gender (Wittwer Backofen 1985:179).

Also, the deposition of working tools in Karataş' and Demircihöyük's graves suggests that the social identity of the deceased may have also been conveyed by their occupation in life: the most common tools are spindle whorls, awls and needles, while others like metal chisels (in Karataş), hatchets and a stone hammer (in Demircihöyük) are less frequent. While tools are not

[27] While the excavators maintain that the bulk of İkiztepe's excavated levels belong to the EBA, and that the cemetery is dated to the late 3rd millennium (Alkım et al.2003; Bilgi 2005; Doğan 2006), analysis by other researchers suggests that the majority of the site's assemblages should be placed within the 5th and 4th millennia horizon (see Welton 2010:42-105 for a detailed reassessment). More recently, AMS radiocarbon samples of human bones from two graves of the "EB III cemetery" produced results supporting the latter interpretation, with dates of 3530-3310 cal BC and 3350-3010 cal BC (Welton 2010:103-104).

a prominent class in the funerary record, they are sporadically retrieved in other EBA necropoleis as well (Massa and Şahoğlu in press). Work specialisation is more clearly attested in settlement contexts, where numerous workshops for obsidian, ground stone and metal are recognised in a large number of cases (cf. chapter 6).

Concerning differences in achieved status, there is a stark distinction in the degree of formalisation of vertical differences at the two sites, one that probably also stems from differences in population size. In Demircihöyük, the possible leaders are detectable only in the burial record by the association with cattle burials and the knobbed maces, while in the settlement the two larger structures do not display particular internal features or concentration of wealth and are in any case integrated with the rest of the domestic buildings. At least archaeologically, the differentiation of the leaders from the rest of the village does not seem based on wealth, and it is interesting that the wealthier assemblages in the cemetery do not belong to the "chiefly graves". Their role may have been limited to the organisation of collective building activities (restoration of the houses, construction of the fortification wall) and decisions regarding the agricultural cycles. On the other hand, in Karataş the Central Complex is at the centre of the settlement, is physically isolated from the residential structures and has a restricted access funnelled by a gate and protected by a sturdy fortification. It is also characterised by an altogether different architectural plan and building techniques, shows the presence of luxury goods not found anywhere else in the settlement and is associated with a number of communal activities immediately outside the perimeter wall. Grave AQ 367 is also unique for its shape (tumulus) and the treatment of the deceased (in secondary burial) and, more importantly, is surrounded by most of the wealthiest graves in the cemetery that possibly belong to the leading group.

Overall, the residents of Karataş' Central Complex seem to have had a much higher level of control over their community: they were able to raise sufficient manpower to build the mansion, they had preferential access to luxury goods and they probably organised (seasonal?) collective gatherings of the community. The wealthy graves buried in trench 98 next to the "chiefly grave" also indicate that there might have been a group (possibly an extended family?) related with the leadership and not a single person, hinting that the position might have been hereditary. In both settlements, however, leaders may have acted as intermediaries between the village and neighbouring communities, and possibly were given authority in moments of emergency like raids or crop failure. The picture emerging from this analysis fits well with the Anatolia-wide trend toward increasing social complexity described in section 1.5. In both villages, the formalization of social differences is expressed through differential funerary ceremonies. In the case of Karataş, it is further reinforced by the construction of a structure larger and better-built than all other buildings in the village, surrounded by a fortified rampart, and isolated at the centre of the settlement (cf. Massa in press).

4.3.2 The socio-political milieu of Demircihöyük and Karataş

The analysis on mobility performed in the last chapter, and in particular the estimation of travel times based on EBA transport technology, can provide here a good reference for understanding what would have been a typical interaction sphere of the individuals living in Demircihöyük and Karataş. With the values suggested in section 3.4, the daily movement on foot would have been restricted to a radius of c.15km, including the return trip home, and longer trips of 2-3 days may have reached up to 30-50km. While it is certainly probable that people may have occasionally crossed this threshold, it is also likely that most of their "interaction sphere" was in fact much more limited, at least in their daily lives. This is confirmed by the various survey projects around Demircihöyük and Karataş indicating that they were embedded within densely populated human landscapes, and that both villages were within an hour’s walk of a number of other settlements. The short distance between these communities suggests that they were intensively interacting with their neighbours, often in forms that are not archaeologically recoverable such as through intermarriages, festivities, joint trips to procure raw materials and other alliances. Even if not detectable at such small scale, transfer of technological knowledge and cultural behaviours must have occurred mostly from village to village, from one individual to another. Participating in a burial ceremony with a new rite or visiting a house made with a different technique might have triggered the desire to replicate it at home.

On top of this, Demircihöyük and Karataş most probably relied on the local valley network to acquire a range of finished and unfinished products: chipped and ground stone, jewellery, stone figurines, textiles, salt and metal among others. What they gave in return for these products is often archaeologically invisible, but it was in all probability a balanced exchange, even if not necessarily in the framework of profit exchange. While Karataş inhabitants possibly exchanged wool, textiles, ground stone tools, the strategy of Demircihöyük's villagers might have been the focus on agricultural produce, given the abundant storage facilities found at the site. Within this context, it seems important to explore the relationship between Demircihöyük's and Karataş' villages and their closest centres, located c.15-25km away (4-6 hours walk). The following chapters will emphasise that, already in the early EBA, larger sites may have started handling more directly the acquisition and redistribution of a number of raw materials and finished products and were in some cases the location of specialised workshops. These centres may have thus provided goods that were not available locally or that could not be manufactured in neighbouring villages. Consequently, the economic strategies of smaller sites may have, to some extent, adapted to provide goods that could be employed for the exchanges, in particular for the acquisition of metal that becomes ubiquitous in the production of tools, weapons and ornaments. This suggests that smaller settlements like Demircihöyük and Karataş may have developed some forms of economic dependency with nearby larger sites. In absence of any evidence for tools of centralised administration such as writing or complex sealing practices, or structured armies, or maintained roads (arguably necessary elements for the formation of true territorial polities), more direct forms of control exercised by larger centres on neighbouring villages seem unlikely at least during the period in which Demircihöyük and Karataş were occupied (c.2800-2550 and 2800-2350 BC). This again seems in line with the wider picture proposed in section 1.5, where I suggested the possibility that some forms of territorial control may have been in place in the later 3rd millennium. This is particularly evident in the Elmalı and Gölova plains, where hilltop settlements seem to have controlled access to the valleys (fig.4.12, cf. also Massa in press).

Another important point to make is that relationships with external groups were not always peaceful in nature, and both sites clearly show that warfare was a recurrent event in the lives of EBA communities. Karataş was destroyed by fire three times (phases II, V:2 and VI:2), all of which were most probably caused by human action since the dispersed settlement pattern would have made it very difficult for the fire to spread from one building to another across c.3ha. The fact that many objects were left in situ (including two sheds full of supplies in period V:2, Warner 1994:181) also suggests that the fire was not caused by the inhabitants themselves but by an external group. Demircihöyük was also destroyed by fire three times, and at least in phase L it seems that it may have been an enemy attack. While only Karataş' Central Complex was fortified, Demircihöyük displays a substantial defensive wall, rebuilt at least in two occasions immediately after two fire conflagrations; burials in both cemeteries show weapon injuries affecting a significant portion of the adult male population.

Who were the attackers? In both settlements there is no archaeologically-detectable evidence of any change in material culture after the destructions; Demircihöyük in particular was rebuilt exactly with the same plan and individual houses were on the same spot as those before the fire conflagration. Therefore, whoever was involved in the attack did not supplant the original inhabitants, but left soon afterwards and left most of the villagers alive. The attacks were probably thus aimed at raiding rather than annihilating the populace or taking possession of the area, but there is nothing that may hint at where these external groups came from (neighbouring villages, uplands?). What is clear is that these episodes of violence are not isolated cases, for similar results are replicated across all EBA Anatolia: most sufficiently excavated settlements show some kind of defensive measures. There is also a noticeable increase in the deposition of weapons, and there are a substantial number of episodes of destruction in the archaeological record, especially towards the end of the EBA, when c.75% of all excavated settlements experience a fire conflagration that invested the whole site (Massa 2014a). Also, weapon injuries on bones occur in different proportions in all osteological assemblages with sufficient analytical coverage (Massa and Şahoğlu in prep:table 3).

While in well-published Chalcolithic and Neolithic cemeteries like Barçın Höyük, Aktopraklık, Ilıpınar and Çatalhöyük weapon injuries are conspicuously absent (Alpaslan-Roodenberg 2011; Hillson et al. 2013; Roodenberg 2008; Roodenberg and Aplaslan-Roodenberg 2008), the late 4th millennium necropolis of İkiztepe provides the earliest evidence of generalized man-to-man violence (Erdal 2005). Despite the fact that this phenomenon is too widespread to have had a single cause, it is worth stressing that is contemporary with the process of general rising social complexity during the 3rd millennium and the possible formation of small polities already towards the end of the EBA (cf. sections 1.5 and 8.3.1).

4.3.3 Demircihöyük, Karataş and long-distance exchange networks

Both sites yield numerous finds that likely originated hundreds of kilometres away, with copper, gold, silver and marble objects prominently figuring in this group. These items underline the fact that even small EBA sites could, already by the mid-3rd millennium, be significantly integrated into a developed network of exchanges. Demircihöyük seems particularly significant in this context, since by virtue of its position on one of the main EBA trunk routes, its detailed stratigraphy and its well-excavated cemetery, it can provide an invaluable insight into the development of interregional exchanges. The Mesopotamian bulla (dated c.2800 cal BC), the tin bronzes (dated c.2700-2550 BC), the 32 local imitations of Syrian perfume bottles (starting at around 2700 BC in the cemetery) and the crescent-shaped axe (c.2700-2650 BC) indicate that (indirect) contacts between the Eskişehir plain, the southern central plateau and Upper Mesopotamia occurred 200-300 years earlier than the date normally accepted, generally set at 2500 BC (e.g. Efe 2007; Şahoğlu 2005). The sharp rise in the occurrence of gold items (most probably coming from the İzmir region or the Troad) in the late cemetery phase further suggests that contacts with coastal western Anatolia may have been established by c.2600-2550 BC. On the other side, despite its isolated position on the Lycian highlands, Karataş displays some contacts with the western Aegean world in the form of a sealed container and a silver miniature double-axe, both dated around 2600-2500 BC.

Chapter 5: Technological transfers in EBA Anatolia

The following chapter will present three case studies of technological transfer in EBA Anatolia. Part of its purpose is to balance the attention given in chapters 6 and 7 to the circulation of goods, by focusing on the notion that EBA interactions also entailed the exchange of a considerable amount of intangible information, including technological know-how. What will be presented here is thus the analysis of how specific skill sets may have been transferred from one community to the other, by identifying the proximate and ultimate origins of the technology, tracing different steps in its adoption across Anatolia and suggesting how it was adapted at a regional level to fit local needs and tastes. Whenever allowed by the archaeological data, the socio-economic context in which these knowledge transfers occurred and the (collective) identity of the individuals that were likely exposed to the technology will also be discussed.

The choice of the case studies relates to the amount of previous work on the topic and the degree to which it is possible to independently acquire and assess the data. While all three examples provide significant evidence that the origin of these technologies is not Anatolia itself but Syro-Anatolia and Cilicia, their selection is by no mean intended to suggest that Anatolia was always at the receiving end of episodes of cultural transfer. Also, evidence presented in the three case studies is geared towards analysis of interaction at the supra-regional scale. In contrast, activities such as hand-made pottery-making, architectural building or dairy production, that would most probably show more localised developments, are either not yet studied from the perspective of technology, or are not studied at all in the context of EBA Anatolia. Their analysis would thus require time and energy that go beyond the scope of this dissertation (see however a brief discussion regarding weaving technology in section 7.1.2). Section 5.1 will present the analysis on the diffusion of metrology (i.e. the use of a standardised system of weights), while section 5.2 will tackle the acquisition of sealing practices for the control over circulation of goods, and section 5.3 will discuss the adoption of the potter's wheel. A general discussion tying up common threads is provided in section 5.4.

5.1 Metrology in EBA Anatolia

The occurrence of balance weights in Anatolia during the early 3rd millennium seems to represent an important shift in how exchanges, or at least the particular subset of exchanges involving the act of measuring the weight of an artefact, were carried out and conceived. Their use hints at some degree of specialisation among the parties involved, since the employment of a system of measures necessitated some mathematical knowledge and in some cases the ability to handle conversions between different metrological systems. Also, more importantly, their employment suggests that the focus of the transaction shifted from the quality of the object to the weight of the raw material that composes it. The aim of this section is to shed light on how these exchanges were performed, looking in particular at the socio-economic context in which they occurred in order to identify the potential actors of these transactions and the nature of the exchanged goods. It will also look into patterns of technological transmission between Upper Mesopotamia, Anatolia and the Aegean, trying to understand the origin of the technology and how and when it was adopted and locally adapted.

It is only recently that balance weights started receiving more detailed analysis in the area; in particular, Lorenz Rahmstorf’s research has statistically identified a range of units of measure employed in the wider region, and has suggested a possible episode of technological transfer between Upper Mesopotamia and the Aegean (2003, 2006a, 2006b, 2009, 2010a, 2010b, 2011a, 2012). His work further allows for to comparison between the EBA Anatolian and Aegean datasets on the one hand and the substantial studies carried out in the broader Near East on the other (cf. Alberti et al.2006; Mederos and Lamberg-Karlovsky 2004; Michailidou 2008; Morley and Renfrew 2010; Pakkanen 2011; Petruso 1978, 1981; Pulak 2000, among others). However, because of the fragmentation and under-publication of the Anatolian dataset, Rahmstorf's research has mostly focused on the Aegean basin and necessarily offers only a limited perspective on both the chronological and archaeological context of the Anatolian finds. Thus the following analysis, building upon this corpus of evidence, aims at providing a more detailed understanding of the socio-economic context of EBA Anatolian balance weights, refining their chronological attribution and further adding new findings.

5.1.1 The EBA Anatolian dataset

The dataset comprises 114 balance weights from west/central Anatolia and Gözlükule in Cilicia; the two main shapes identified in EBA Anatolia are the so-called sphendonoids (93 specimens) and spools (21 pieces) from 17 sites (figs.5.1-5.4). Rarer forms (ovoid, spherical) are found at a few sites (including Troy and Gözlükule) but are not included in the analysis because they have not been so far studied with enough accuracy. A peculiar find from Troy III (latest 3rd millennium) is however worth mentioning in more detail, since its shape (a water bird, fig.5.4.28) is unique in Anatolia but has numerous parallels in Syria and the Levant (Bobokhyan 2009:30, fig.11; Rahmstorf 2006a:20). The shape of sphendonoids and spools remains relatively constant across the EBA and the sphendonoid weights are still extensively employed in the 2nd millennium, while the spool weights make only sporadic appearances in MBA and LBA Aegean contexts (Bobokhyan 2009; Haas-Lebegyiev and Renfrew 2013:499; Kool 2012; Pulak 2000; Rahmstorf 2006a:26-28). Sphendonoid weights (fig.5.4.9-5.4.20) are mostly made in fine-grained dark stones (hematite, diorite, basalt), and tend to have a rounded elongated bi-conical shape, while spool weights (fig.5.4.1-5.4.8) tend to have a slight hour-glass shape and are normally made of marble, limestone or *Spondylus* shell, though several examples are made of lead (e.g. finds from Poliochni, Ayios Dimitrios, Lithares, Dhaskalio and Aegina). The spool weights can be distinguished from the contemporary Aegean marble pestles by their sharp edges, the absence of pecking marks and the generally better manufacture. The balance weights found in Anatolia are normally very small and weigh between 5-100gr (fig.5.6), a pattern discernible also in the EBA western Aegean and in MBA Kültepe (Kool 2012:table 1; Rahmstorf 2010b:689).

Several balance beams were also found at sites that also yielded balance weights after c.2600-2500 BC, including Troy, Alişar Höyük, Poliochni, Küllüoba and Bozüyük (figs.5.4.29-5.4.36, 5.5). All these objects are made of carefully polished bone, are 9-23cm in length, and have two holes at the extremities to attach it to the balance plates and one in the middle to hold the scale itself. Their small size correlates with the small size of the balance weights and suggests that they were used to weigh solid objects with a low volume (cf. Rahmstorf 2006b:73).

5.1.2 Chronological and spatial distribution

In the wider Near East, the earliest balance weights occur a few centuries before their appearance in Anatolia. These include Egyptian pieces from the cemetery of Tarkhan (c.3000 BC) and a stone weight inscribed with the name of Narmer (Dynasty 0, c.3100-3000 BC, Grimm et al.2000:73). In Upper and Lower Mesopotamia, some stone weights are found in Late Uruk levels (c.3400-3100 BC) both at Tepe Gawra and Uruk, though from early 20th century excavations and thus from not entirely reliable contexts. At Fara/Shuruppak, some stone objects coming from Jemdet Nasr/ED I contexts (c.3100-2800 BC) have been identified as weights, though they have not been analysed in detail so far (Rahmstorf 2006a:20). While a system of measures for length and volume is already attested in Late Uruk tablets (Nissen et al.2004), and it is thus probable that a system of weights might have developed already around this time, it is not until c.2500 BC (in the Fara/Shuruppak archives) that texts explicitly mention the systematic weighing of objects (Powell 1999).

The earliest sphendonoid weights found so far in Anatolia are three pieces from Çukuriçi Höyük in phases IV-III, radiocarbon-dated to c.2900-2750 cal BC (Horejs 2009; Barbara Horejs pers.comm. 25/07/2012), and match a piece coming from Gözlükule "EB I late" levels (c.2800-2600 BC, Goldman 1956:275). The first spool weights belong to the same archaeological horizon: one specimen was found in Poliochni Blue Archaic, megaron 832 level 2, a burnt layer radiocarbon-dated to c.2910-2670 cal BC (Begemann et al.1992:220-221; Bernabo' Brea 1964:112). With the available data, balance weights seem to occur at sites along the eastern Aegean coast a few hundred years earlier than in central Anatolia, a pattern that is however likely to stem from the almost complete absence of well-documented early EBA contexts on the central plateau (section 1.7.2). During the mature EBA, both types are found at an increasing number of sites, especially after c.2300 BC (fig.5.6); at Troy IIg and Poliochni Yellow, sphendonoid weights are found in the same level and in the same context as spool weights. In the western Aegean, the appearance of weights (only the spool type) seems so far later than along the eastern shores. One of the earliest secure finds in the area[28] is a lead spool weight from Lithares in Boeotia, dateable to the Early Helladic IIA phase (Rahmstorf 2006b:73). Two other examples come from Tsoungiza, one from "EH II Developed Phase 1", contemporary to "Lerna III phase late A-early B", the other from a layer contemporary with Lerna IIIB late, and another spool was further found at Lerna in level IIIB (Pullen 2011:15, table 1.2; Wiencke 2000:136; Lorenz Rahmstorf pers.comm. 25/03/2014). All these finds can be dated at the beginning of the Early Helladic IIA phase (c.2700-2600 BC) and contemporary with Poliochni Green, thus one or two centuries later than Poliochni Blue and Çukuriçi Höyük IV-III. In the later EBA, spool weights are found at an increasingly large number of sites in the Cyclades and mainland Greece, a trend comparable to that of eastern Aegean and Anatolian sites.

Spool weights are distributed mainly within the Aegean basin (fig.5.6), with a few specimens as far east as Gözlükule and as far west as the Ionian islands, but in most cases in close proximity to the coast (Rahmstorf 2006b:fig.11; 2010a:fig.8.5). In this regard, their presence in inland Anatolia is possibly problematic: a stray, broken specimen from Demircihöyük (fig.5.4.8) can only be tentatively attributed to this category. On the other hand, sphendonoid weights have a much wider distribution that covers most of Mesopotamia and the Levant and stretches as far as the Indus valley (cf. Rahmstorf 2006b, 2010a); their westward limit is, with the available data, set along the eastern Aegean seaboard with Poliochni as the westernmost finding point.

5.1.3 The archaeological context

In Poliochni, 15 specimens were found in different levels of the settlement: while in some cases the context did not provide clues about its function, most of the findings come from the area

[28] Lorenz Rahmstorf includes in his work two specimens from different graves at Ayios Kosmas, dateable to the "Kampos" group (pers.comm. 25/03/2014). However, in the original publication both were clearly described as having traces of pigment on them (thus probably better interpreted as pestles), and one is further actually outside the grave, hence not stratified (Mylonas 1959:87, 99, 143, figs.166.8 and 166.11).

inside or immediately adjacent to megaron 605 (period Yellow), the richest context of the settlement, and from the complex around megaron 832 (periods Blue and Red). Both buildings have enough evidence to suggest the presence of metallurgical workshops throughout the occupation of the settlement, and a concentration of wealth not paralleled elsewhere in the settlement (section 6.2.3). At Çukuriçi Höyük, three stone weights were found in a levelling activity layer between phases IV and III, both with extensive evidence of a metallurgical workshop occupying most of the excavated area (Horejs 2009; Barbara Horejs pers.comm. 25/07/2012). In Thermi, the single spool weight was found in phase IV area Epsilon, where metallurgical activities are concentrated in all phases of the settlement’s life. In the same area, a very rare tin bangle has been found level IV, while in earlier and following periods there is a concentration of imported wares and metal objects (Kouka 2002; Lamb 1936:195). In Küllüoba, a single sphendonoid weight has been recently retrieved in the “EB III votive pit horizon" (c.2400-2200 BC) within the courtyard of the citadel, in the same area where also a bivalve mould for shaft-hole axe was found in contemporary layers (Fidan 2013b; Murat Türkteki pers.comm. 15/08/2012). In Kestel mine 2, a hematite sphendonoid weight was found inside a pit-house at the entrance of the mine itself, possibly used as shelter by the mine workers (Yener 2000:96). The close association between weights and metallurgical activity is also well-documented in the western Aegean (Rahmstorf 2006b:75-76). At Troy, the three weights found by Blegen were clearly located in an elite neighbourhood: while the rooms are only partially excavated, adjacent rooms have gold hoards and a large range of metal artefacts (Blegen et al.1950:359, 366-369); many more weights were found by Schliemann in the “Third Burnt City” (=Troy IIg, Schliemann 1881:479). On the contrary, at neither Aphrodisias nor Gözlükule do the retrieval contexts bear the marks of elite or special-purpose buildings. For the remaining sites (Alişar Höyük, Emporio, Limantepe, Tavşan Adası, Kusura, Acemhöyük, Bozüyük, Karaağaç Tepe) very little or no information on the contexts can be provided.

5.1.4 Discussion

Metrology is not a technology that is easily replicable independently, and its employment is documented earlier both in Mesopotamia and Egypt than in Anatolia. Further, some of the shapes (e.g. sphendonoid and ovoid types) and all the identified Anatolian units of measure (7.8gr, 8.3-8.5gr, 9.4gr and 11.75gr) find good parallels in Levant and Mesopotamia. Therefore, it seems fair to argue that the ultimate origin of this technology should be sought outside Anatolia, and its adoption in the region should be interpreted as a product of intense contacts with Levantine and Upper Mesopotamian societies (cf. Rahmstorf 2011a). The date for the first appearance of metrology in west and central Anatolia is set at c.2900-2750 cal BC by the two well-stratified contexts of Poliochni Blue Archaic and Çukuriçi Höyük IV-III. This horizon precedes by several centuries the accepted date for the flourishing of interregional exchange networks (c.2500 BC, cf. Bachhuber 2015; Efe 2007; Şahoğlu 2005).

Based on the small size of both weights and balance beams, their use in Anatolia seems confined to measuring the weight of small objects with high value and low volume (e.g. semi-precious stones and precious metals). The employment of balance weights is particularly well-documented in conjunction with the exchange of metal (cf. Horejs 2009; Rahmstorf 2003:296-297), e.g. at Poliochni, Thermi, Çukuriçi Höyük, Küllüoba and Kestel. Their earliest appearance also follows a detectable increase in the scale and complexity of metal production and exchange from the late 4th millennium onwards, in a period where there is an overall rise in the volume of transactions and the consequent need for regulated practices of trade (cf. sections 6.2.6 and 8.3). Contemporary with the occurrence of the earliest balance weights, metal ingots and ingot moulds start appearing at numerous locations including sites that also have weights, such as Troy, Çukuriçi Höyük, Aphrodisias, Limantepe, Bozüyük, Kestel/Göltepe and Alişar Höyük (fig.6.21). The presence of ingots suggests the need to have a form to exchange metals as raw materials rather than finished artefacts, and with the value of the item being represented by its weight rather than its shape and quality (cf. Bachhuber 2011). Although there is no evidence that the ingots themselves were shaped to have a specific volume (it would be anyway very difficult to achieve it, given the use of open moulds), their estimated weights in most cases range between 10-500gr (fig.6.22), i.e. compatible with the size of known EBA balance beams and balance weights. It is therefore probable that, at least in some cases, metal ingots were exchanged using weight equivalences.

The areas where the technology was first adopted are most likely Cilicia and Cappadocia, both close to the important metal reserves of the Taurus Mountains (section 6.2.1) and at the interface with the Mesopotamian world. Cilicia in particular has a long history of contacts with the Amuq valley, the northern Levant and northern Syria already in the Neolithic and Chalcolithic periods (Mellink 1956). Apart from a sphendonoid weight from Gözlükule "EB I late", there is presently little evidence of the early use of metrology in the area; it is however worth mentioning that small amounts of Taurus copper were circulating in Upper Mesopotamia already during the late 4th-early 3rd millennia (Begemann and Schmitt-Strecker 2009:21-26). Based on this evidence, it seems thus possible to suggest that metrological practices arrived in Cilicia/Cappadocia through the mediation of Levantine/Mesopotamian traders, and that initial exposure to this technology occurred among Anatolian metalworkers, which were in all likelihood dealing with the exchanges. As interregional exchange networks developed within Anatolia, metrological practices may have been acquired by specialised Anatolian traders as well.

From this interface region, the metrological know-how likely diffused inland and along the southern and western Anatolian coasts. The earliest finds, perhaps not accidentally, come from areas where silver and gold deposits are concentrated, i.e. the Troad and the İzmir region (fig.6.13). With the available evidence, the earliest spool weights in mainland Greece (at Lithares, Tsoungiza and Lerna) appear at around 2700-2600 BC and thus later than at sites along the eastern Aegean seaboard, suggesting a westward diffusion of the technology and further challenging the idea that this type of artefacts has its origin in the western Aegean. In inland Anatolia, the process of adoption does not seem to entail an archaeologically-visible process of adaption of the technology. While data are overall scarce and scantily published, it seems that sphendonoid weights (diffused across most of the Near East) are the dominant shape, and the four analysed pieces from Alişar Höyük and Küllüoba all seem to fit the 8.3-8.5gr unit of Mesopotamian origin (fig.5.6). In the Aegean, on the other hand, the Levantine/Mesopotamian units of measure (7.8gr, 8.3-8.5gr, 9.4gr and possibly 11.75gr) are employed, but the spool shape seems a local innovation, whose origin is probably the eastern Aegean seaboard.

It is intriguing that the spatial distribution of the two main shapes of weights, sphendonoids and spools, is largely distinct (fig.5.7): the former type is only present in Anatolia, while the latter is mainly distributed within the Aegean basin. In this regard, the presence of spool weights at Gözlükule already by the early "EB II" levels (c.2600-2400 BC) suggests possible maritime connections with the Aegean mediated by the southern Anatolian coast, at present virtually unexplored. This pattern suggests the presence of two different interregional networks that are marked by different transport media (sea versus land) and transport carriers (boat versus pedestrian/animal movement). The distribution of spool weights hints at the existence of a network connecting Aegean and Levant through the southern Anatolian coast, while the sphendonoid weights’ distribution suggests an overland network connecting the central plateau with Upper Mesopotamia, via Cappadocia and the Antitaurus Mountains. With the available evidence, only coastal sites (Troy, Poliochni, Gözlükule, Çukuriçi Höyük) show the co-occurrence of both types, perhaps a hint of their role as mediators between two different exchange networks (sections 7.2-7.3).

As a last remark, the employment of metrology suggests that, already by the early 3rd millennium, a portion of the exchanges within Anatolia was driven by profit rather than other forms of interaction (e.g. gift exchange, reciprocity, redistribution). The desire to measure accurately the weight of an artefact during the exchange suggests the existence of a system of values attached to specific quantities of materials. This system most likely was fluctuating through time and even from one transaction to another, depending not only on the intrinsic quality of the material, but also on the relationship between the two parties and the perceived value of the raw material in a specific location. However, since balance weights are, even at the end of the EBA, restricted to a small number of sites and to a limited range of contexts, most exchanges probably occurred outside a standardised weight system.

5.2 Sealing practices in EBA Anatolia

Sealing can be described as the act of impressing (stamping or rolling) an object on a support material, either directly on the surface of a clay vessel before firing, or on a lump of wet clay (or wax/mud) applied to a container/door knob. The act of sealing can have multiple functions:

a) when impressed on a door lock, it documents the identity of the individuals that accessed a specific room, preventing or at least revealing unauthorised access;

b) secure the contents of a container, preventing their tampering between the place of manufacture and the final place of opening;

c) guarantee the quality of a product and its origin (much as in modern branding).

In more sophisticated contexts, the design of the device is normally created to be recognisable and uniquely linked to its owner or office, but this is not necessarily the case in EBA Anatolia. The adoption of sealing practices represented a fundamental technological innovation for the EBA Anatolian communities, a tool that allowed more direct control over production and redistribution and an essential step towards the fully-fledged centralised administration of the early 2nd millennium polities. Despite its perceived importance for the broader understanding of socio-political dynamics, and despite the large number of so-called "stamp seals" in EBA Anatolian contexts, there has been so far very little research on the topic, and the few cursory works are based only on finds from better-published sites (Laurito 2000; Rahmstorf 2010b:682-683; Tonussi 2007:291-322). What also seems surprising is the complete lack of specialist work, an issue that seems particularly cogent especially when compared to the substantial corpus of research on Upper Mesopotamian and Aegean seals. In fact, the following analysis suggests that most of the “stamp seals” were most likely not employed in administrative practices but as devices to impress patterns on clothing and other media, and thus will be consistently labelled “stamps” hereafter.

In keeping with the general topic of the dissertation, the EBA Anatolian corpus of stamps, definite seals, sealings and seal-impressed objects will be here analysed to reveal patterns of interaction at a regional and interregional scale, including regions immediately adjacent to the study area (Cilicia and the Aegean basin).

5.2.1 Analytical limitations

While stamps, cylinder/gable seals and impressed pottery are all highly visible in the academic literature because of their supposed nature as markers of social complexity, most finds are not properly documented (measured, drawn, photographed, contextualised), thus significantly hampering the process of independent analysis. Additionally, sealings and stamps would have been easily missed in the large-trench excavations that were customary until very recently in Turkey, especially if coupled with absence of systematic dry-sieving. Also, since EBA Aegean and Anatolia sealings were in all likelihood not intentionally baked for preservation in the archives as happened, in contrast, in contemporary Mesopotamia (Rahmstorf 2012:315), they would have been preserved in the archaeological record only if their repository had suffered a fire. Thus, the absence of sealings at EBA Anatolian sites should not necessarily be taken as real, particularly at sites that were investigated prior to the introduction of modern excavation techniques. Lastly, while excavations at large centres such as Kültepe, Yassıhöyük and Ovaören have recently started and, at present, have produced only very preliminary reports, there are already hints that the full publication of these sites will radically change our perspective on many issues, including EBA sealing practices.

5.2.2 The EBA Anatolian dataset

The dataset collates some 260 pieces coming from 40 sites in western Anatolia, central Anatolia and Cilicia (mapped in figs. 5.8-11 and listed in figs.5.12-15); each specimen was individually entered, with information regarding dimensions, shape, materials, motif, context date, context description, and references. Since in the treatment and analysis of the data a large number of individual pieces will be mentioned, their references have been omitted in the text if they are already present in the catalogue. This catalogue and the following analysis integrates and builds upon data and analysis of the only detailed assessment of the western Anatolian corpus of EBA stamps, seals and seal-impressed objects which is at present still unpublished (Karnava and Massa in prep.). The dataset is composed of different sections:

Stamps (“**St**”): the catalogue includes 100 western Anatolian pieces, 70 central Anatolian pieces and 17 Cilician pieces. A large number of stamps could not be recorded in the database because they were not published in sufficient detail (i.e. at least with an individual scaled photograph). They include over 100 examples from Bademağacı (Duru and Umurtak 2011:14), and another 20-30 pieces from other sites such as Gavurtepe (Meriç 1993:356), Keçiçayırı (Efe et al. 2011:15), Karaoğlan Höyük (Arık 1948:59) and Kalınkaya (Zimmermann 2007:24).

Cylinder and stamp-cylinder seals ("**Cy**"): the catalogue includes eight pieces from western Anatolia, six from central Anatolia and two from Cilicia. Ten pieces are mentioned as coming from Seyitömer (Bilgen 2011:211) but only two were individually published.

Other seals ("**Os**") that were in all likelihood produced outside Anatolia include three pieces from central Anatolia and six from Cilicia.

Sealings ("**Sg**"): the catalogue includes six sealings from western Anatolia, five from central Anatolia and 11 from Cilicia. Excluded from the catalogue are a sealing from Bademağacı (Duru and Umurtak 2011:14), several pieces from Yassıhöyük (Omura M 2014:419), and a thousand sealings found at Kültepe but so far only cursorily reported (Kulakoğlu and Öztürk 2015).

Impressed pottery ("**Im**"): the catalogue includes 13 pieces from western Anatolia and 14 from Cilicia.

In addition to this catalogue, the online version of the "Corpus der minoischen und mykenischen Siegel"[29] was employed for the mainland Greek, Cycladic and Cretan glyptic corpus. The individual entries have been consistently referenced throughout the text with the database's own inventory, marked by the acronym "**CMS**" and followed by consequential inventory numbers.

5.2.2.1 Stamps

The defining trait of western and central Anatolian stamps is their repetitiveness in terms of shapes and motifs, a pattern that can be better appreciated when comparing them with Aegean and Cilician specimens, or with later MBA Anatolian stamp seals. The EBA stamps (figs.5.8, 5.12, 5.16) clearly stem from a well-developed tradition rooted in Anatolian prehistory, and share with their predecessors a general similarity in dimensions, stamp shapes (conoid or stalk-handled), materials (clay, bone and stone) and motifs (predilection for angular non-figurative motifs). They however tend to have a narrower range of surface shapes (mostly circular or rectangular) and there are detectable differences in some of the motifs.

The vast majority of the EBA specimens are made of clay or stone, and more rarely of metal,[30] though the number of metal specimens is very likely an underestimation, since they would have been re-melted once no longer employed; bone is very sparingly employed in Anatolia. Clay

[29] Consulted through the ARACHNE Database interface, http://arachne.uni-koeln.de/arachne/index.php?view[section]=objekt&view[layout]=search_form_category [last accessed on 30/09/2014].

[30] The earliest metal stamps appear at Alişar Höyük level 13M (von der Osten 1937a:82) and Gözlükule "EB II" levels (Özbal et al.2005), c.2700-2600 BC.

stamps tend to be larger on average (22-33mm) than bone, stone and metal pieces (13-21mm, fig.5.18a). Most of them have a suspension hole (93% of the total preserved pieces), and tend to present a conoid/tronco-conoid shape (if they are made of clay, see e.g. fig.5.16.12) or stalk-handled/button shape (if they are made of stone, bone or metal, e.g. fig.5.16.3). Significant departure from these shapes is rarely observed, and is mostly limited to foot-shaped stamps (fig.5.16.34). Two bird-shaped and bell-shaped stamps are at the moment unique and might be true imports from Crete (figs.5.16.46 and 5.16.48, see below for further discussion), while the ring-seal from Poliochni Red (**St043**, fig.5.16.1) is again an isolated find in Anatolia but has several (later) comparanda in Crete. With regard to the shape of stamping surfaces, the overwhelming majority is circular or rectangular, with rhomboidal, oval or foot shapes being less common (fig.5.19). Deviation from these shapes is rare (3% of the total), and include lobate and star-shaped examples (figs.5.16.28, 5.16.29, 5.16.36 and 5.16.38).

Regarding motifs depicted on the stamping surfaces, it is quite striking that there is not a single instance of a clear figurative design, in contrast with contemporary examples from the Aegean and Upper Mesopotamia/Levant. Circa 88% of the designs are composed of simple geometric compositions characterised by angular lines, a trait that quite starkly separates them from the Aegean corpus where wavy, spiral and curvilinear patterns are mostly employed;[31] abstract symbols are present on 12% of the stamps, that are in all cases made out of clay (cf. figs. 5.16.39-5.16.45). By far the most common geometric motif is the angle-filled cross, represented in slightly different variations on 26% of the dataset (figs. 5.16.1-5.16.5); another common design is the grid motif, again occurring in simpler or more complex form on 8% of the corpus (figs. 5.16.6-5.16.10). Other well-represented designs are the hatched cross (6% of the total, figs. 5.16.11-5.16.15) and the "radial lines departing from concentric circle" motif (6%, figs. 5.16.21-5.16.26). The spatial and chronological distribution of the three commonest motifs (angle-filled cross, grid and hatched cross) are not limited to EBA Anatolia, but have a much longer history also in earlier periods and in other areas; however, they seem to be very popular in the region, where they represent 40% of the total.

Most academic literature correlates the use of EBA Anatolian stamps with administrative practices. However, further analysis suggests that, while some of these stamps seem to have been impressed on sealings and on pottery, most (in particular the clay pieces) were in all likelihood not employed as administrative devices, a hypothesis based on the following observations:

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[31] Tentatively, this pattern may be related to the use of different tools for stamp/seal making, such as the use of small bow-drills in the Aegean.

a) In many cases the shapes and the motifs are immediately reminiscent of Neolithic or Chalcolithic specimens, that were clearly not employed as seals given the absence of sealings;

b) Most stamps are made out of clay, an unlikely medium for administrative devices, and a material not generally employed for seal production in Aegean or Upper Mesopotamia;

c) Most of the sealings/impressions seem to have been made with non-clay seals, as indicated by the neatness of the motif impressed, the size, and their shapes;

d) Most of the motifs on stamps are not represented on sealings/impressed pottery, in particular the symbol-filled designs that are present only on clay stamps;

e) All of the reconstructable sealings/impressed pottery have been made with circular (13) or rectangular (2) seals, thus suggesting that stamps with other surface shapes may have not been employed as seals;

f) The stamps retrieval contexts are very varied and they are generally not found within public buildings; they are identified in most settlements, often in very small sites on the uplands like Kaklık Mevkii, Bağbaşı, Ahlatlıbel, Koçumbeli and Eti Yokuşu (0.3-0.5ha in size). The site with the largest number of stamps (120+) is Bademağacı, also a small (2ha) highland site;

g) Only three out 187 stamps (1.5%) are found in secure burial contexts, at Bakla Tepe (a possible Cretan import, **St069**), Kalınkaya and Gavurtepe – the latter in an infant grave (Meriç 1993:356; Zimmermann 2007:24). Significantly, neither stamps nor cylinder seals are found in the elite graves of Alacahöyük, Resuloğlu, Oymaağaç and Horoztepe;

h) When their archaeological context can be reconstructed, stamps are often associated with clay brushes, spindle whorls and loomweights, suggesting their employment in the textile industry.

So, if they were not administrative devices, what was their function? In most cases, they were clearly meant as stamping devices, possibly to be employed in the decoration of leather, textiles, or human skin (the so-called “pintaderas”), a hypothesis that has been put forward for Neolithic and Chalcolithic stamps as well (Çilingiroğlu 2009; Özkan 2001; Türkcan 2006). This hypothesis is strengthened by the fact that at least two stamps from Aphrodisias and Kusura (**St035**, **St048**) have traces of white and yellow paint on their stamping surfaces (Lamb 1938:268; Sharp-Joukowsky 1986:610). In this context, the printed patterns were possibly expressing personal identity and/or affiliation to a group that used similar motifs, since while they were normally carved with simple designs, there are no exact copies within the extant Anatolian corpus.

There seem to be an objective analytical difficulty to clearly identify the function of the Anatolian stamps, even when various parameters (e.g. size, stamp shape, surface shape, material, motif, context and comparison with impressions on sealings/pottery) are employed and correlated. This blurriness probably represents a situation in which the same object could have been used in different contexts and for different reasons. It seems relevant to highlight the simplicity of most stamp motifs, also those impressed on sealings, and the lack of desire to make them unique and attributable to a specific owner. This is immediately perceivable when EBA Anatolian motifs are compared with EBA Aegean and MBA central Anatolian pieces, clearly manufactured to represent identifiable individuals/groups. In the latter examples, metal seals are produced with lost wax technique, while even in late EBA Anatolia most metal stamps are produced with open moulds and angle-filled or hatched cross designs and can thus be repeated an infinite number of times (fig.5.20).

5.2.2.2 Non-Anatolian seals

Across EBA Anatolia there is a significant number of seals (c.10% of the dataset) whose origin is probably non-Anatolian based on their shape, their manufacturing materials, and their iconography (figs. 5.9, 5.13 and 5.21). Cylinder seals, followed by gable seals, a single tabloid seal and a single button seal, represent the largest group. Since there are no recorded cylinder and stamp-cylinder seals in west/central Anatolia or the Aegean prior c.2400-2300 BC, it can be suggested with a certain degree of confidence that they are not a native Anatolian form. The prevalent materials employed in their manufacture (faience, lapis lazuli and ivory) further hint that the majority of the specimens may have been produced outside Anatolia, since these materials are extremely rare in the region (sections 7.2.3.4, 7.2.4.2). The only exception might be represented by the Trojan clay cylinders, which are however separated from the rest not only because of their size (fig. 5.18b), but also because of their motifs. Another bone stamp-cylinder from the same site (**Cy005**) might be a local adaptation.

With regard to the seal shapes, two groups can be clearly defined: cylinders (with axial perforation) and stamp-cylinders (with suspension hole at one end and stamp at the other end). While the cylinder is a shape common throughout the ancient Near East in earlier and later periods, the distribution of stamp-cylinders is largely restricted to Levant and northern Syria (Aruz 2008:4, 35), which might indicate a possible origin for the Anatolian finds. In terms of motifs, two main groups can again be identified, one with simple geometric patterns (figs. 5.21.3-5.21.5, 5.21.10, 5.21.15, 5.21.16) and one with figurative motifs (figs.5.21.1, 5.21.7-5.21.9, 5.21.11-5.21.14). The latter group, often including anthropomorphic figures, is a further strong hint for a Levantine/Upper Mesopotamian origin of the pieces, since human iconography is essentially unknown in contemporary Anatolian craftsmanship outside the production of clay figurines. For the Alişar Höyük’s cylinder (**Cy101**), an almost perfect match can be found in a piece from the Khabur (Matthews D 1997:pl.X.57). The gable seals appearing in Cilicia and the Kızılırmak bend during the late EBA (figs.5.21.17-5.21.22, 5.21.25) show a preponderance of zoomorphic motifs, alien to the local glyptic tradition and thus probably produced outside the region. Given that the majority of gable seals are found within Syro-Anatolia, where they have been produced over a wide chronological span from the 5th to the early 3rd millennia (Aruz 1992; Buchanan 1967; Mazzoni 1980), it seems possible to suggest that the manufacture of most of the Anatolian specimens may be attributed to the same origin. A tabloid seal and a button seal from Gözlükule represent for the moment the only such examples in the panorama of EBA Anatolia (figs. 5.21.23-5.21.24). In particular, the button seal in glazed steatite (**Os007**) is very distinctively not local, and can be traced to an Egyptian manufacturing tradition (5th Dynasty, c.2500 BC) because of the material, the shape and the carved motifs (Goldman 1956:238). Excluding an ovoid bulla from Demircihöyük (see below), at the moment there are no known sealings made with cylinder seals anywhere in EBA western/central Anatolia and Aegean. This contrasts with MBA central Anatolia, where cylinders in local "Anatolian" style seal represent a significant proportion of the total sealings at sites like Acemhöyük, Konya-Karahöyük and Kültepe (Alp 1968; Özgüç N 1989; Özgüç N and Tunca 2001). The same can be said for sealings produced by stamp seals with zoomorphic motifs such as those carved on most of the gable seals found in Anatolia.

In cases where the associated context is available, these non-Anatolian seals are mostly found in elite areas of the settlement, e.g. in Poliochni Yellow's megaron 605 (**Cy001**), in the Seyitömer level V-A "Palace" (Cy007-008), in the Kültepe level 11a "Palace" (**Cy104**), in Alişar Höyük's "citadel" (**Cy101, Os003**), and Troy IIg "citadel" (**Cy002-Cy006**). Intriguingly, these seals mostly occur in archaeological contexts that are dated several hundred years later than their supposed manufacturing horizon, hinting that they might have stayed in circulation for a long time and passed through the hands of a large number of owners (fig.5.24).

At present, sealings impressed by cylinders or by stamps with figurative designs only occur in Cilicia, but not in EBA west-central Anatolia.[32] Even though these items might potentially have been employed on perishable supports (e.g. wax) and thus not preserved, there is at present no evidence for the use of alternatives to clay sealings in Bronze Age Anatolia. It seems therefore feasible to propose that these forms were not employed as administrative tools in the region. On the other hand, their long history of circulation, coupled with their retrieval in elite contexts, suggests that they might have been perceived as valuable objects because of their exotic appearance and their conceptual connection with the Near Eastern world.

[32] With the possible exclusion of the Kültepe sealings, for which at the moment there is no preliminary assessment on their context, typology and, more importantly, date.

5.2.2.3 Sealings

Sealings occur for the first time in Anatolia during the early 3rd millennium, several millennia after their first employment in Upper Mesopotamia and c.1500 years after their first appearance in Cilicia and the Upper Euphrates valley (Rahmstorf 2011a:fig.9.2). It seems therefore likely that the concept and technology behind their use would have been transmitted to Anatolian communities from the adjacent regions . Most of the EBA Anatolian sealings (21 pieces out of 22) belong to the category of direct sealings, i.e. lumps of wet clay applied on a container or door knob and impressed with one or multiple seals (fig.5.22). The other category is represented by ovoid bullae, applied on two strings that were further wrapped around the lid of a container; the only example in the area comes from Demircihöyük phase F_2 (**Sg001**). In the case of direct sealings, it is often possible to identify, from the inspection of the surface opposite to the seal impression, the medium on which the clay was impressed. Out of 13 sealings for which the reverse is documented, 12 are clearly placed on containers: **Sg002** from Karataş was applied on a basket, **Sg003** from Myrina has impression of strings, **Sg004** from Myrina was placed on a leather sack or a leather-covered vessel mouth, and **Sg106-114** from Gözlükule are all jar/jug stoppers and were found in the same room. The only example that can tentatively be attributed to a door sealing is **Sg005** from Bademağacı, because of the shape of the impression (possibly a door knob? c.35mm in diameter) and very fine parallel lines that the excavator attributes dubitatively to a wooden object (Umurtak 2010:21).

Comparing the motifs of the seals that impressed the sealings, three main glyptic groups can be defined (fig.5.25). Only six out of 20 sealings with recognisable impressions can be attributed with confidence to the Anatolian glyptic tradition:

a) **Sg005** from Bademağacı (possibly sealing a door), which has an almost perfect match within the site itself (**St056**, fig.5.16.19);

b) **Sg100** from Alişar Höyük, with good parallels in west and central Anatolia (e.g. **St037**, **St200**, fig.5.16.8);

c) **Sg101** from Alişar Höyük, whose motif has a good match in **St091** (fig.5.16:43);

d) **Sg 102** from Alişar Höyük, which has two perfect matches at the site itself (**St208**, **St223**, fig.5.16.31);

e) **Sg103** from Alacahöyük, with a common diagonal lattice (grid) motif that finds an exact parallel at the site itself (**St200**, fig.5.16.8);

f) **Sg115** from Yumuktepe, with a very common angle-filled cross motif.

A second group of sealings shows similarities with Levantine/Upper Mesopotamian motifs and shapes:

a) **Sg001** from Demircihöyük (the only ovoid bulla and the earliest piece in central Anatolia), which is impressed by a cylinder and a stamp, probably belonging to the same device;

b) **Sg104** from Kültepe, impressed by a cylinder with zoomorphic motif (but whose date and context are unknown);

c) **Sg106-St114** from Gözlükule, impressed by cylinder and stamp seals with geometric or floreal motifs with no affinity to the Anatolian glyptic tradition.

The third group is represented by sealings that likely belong to the Aegean glyptic tradition, because of their curvilinear motifs that have no parallels with inland Anatolia:

a) **Sg002** from Karataş, that has good parallels with seals from Lerna and Keos (Aruz 2008:39);

b) **Sg004** from Myrina, almost an exact match with a piece from Ayia Irini (**CMS V 473**, Cultraro and Dova 2004:336);

c) **Sg006** from Troy, similar in design to **Sg004**.

The earliest sealings in western Anatolia occur at Myrina in a level contemporary with Poliochni Blue Archaic (c.2900-2800 BC, **Sg003**) and Demircihöyük phase F_2 (c.2800-2750 cal BC, **Sg001**). In central Anatolia, **Sg100** comes from Alişar Höyük level 17M (c.2900-2800 BC). Sealings thus seem to appear along the eastern Aegean seaboard much earlier than in mainland Greece, where the earliest well-stratified sealings occur during the Early Helladic IIb period (c. 2500-2400 BC) at Lerna IIIC and Geraki (Pullen 1994; Weingarten et al.2011). A similar date can be provided for the earliest Cretan sealings.[33] Also noteworthy is that sealings characterised by a clear "Aegean" motif (**Sg002** and **Sg004**, c.2700-2600 BC) also occur in the eastern Aegean at an earlier period than the earliest seals and sealings with similar motifs in mainland Greece. At approximately the same time, the earliest metal seals (**St037** from Karataş V:1/2, **St043** from Poliochni Red, **St213** from Alişar Höyük level 13M) start to be deposited into archaeological contexts, and this may not be a coincidence since the majority of the impressions are apparently made with metal pieces. Where detailed information on the context is available, sealings seem to occur either within elite areas (Alişar Höyük "Citadel", Kültepe "Palace", Karataş Central Complex) or storage rooms (Bademağacı "Multi-Roomed Building 2" and Gözlükule room 30, the latter containing **Sg106-Sg114** and a number of large storage jars). The only exception so far is represented by **Sg001** from the central courtyard at Demircihöyük, a very small community village (c.100 people), that is however one of the main natural routes connecting the central plateau with north-western Anatolia.

[33] Two sealings found in EM IIa levels at Knossos (c.2800-2600 BC, Schoep 2006:44-45) seem however stylistically dateable no earlier than MM Ib/II (early 2nd millennium, cf. Gill et al.2002:5).

5.2.2.4 Seal-impressed pottery

In Anatolia (as in the Aegean), impressions of seals on pottery (applied before firing) mainly occur on medium/large-sized storage jars, with the only exception of Gözlükule where they are consistently found on jugs and cups (figs.5.11, 5.15, 5.23). Intriguingly, within the study area they are only found at coastal sites in Cilicia, western Anatolia and the Aegean, the site furthest inland being Karataş, c.70km from the Mediterranean coast. As in the case of the sealings, seal-impressed pottery is found in much larger quantities (1,300 pieces) and at an earlier date (late 4th and early 3rd millennia) in Levant and Upper Mesopotamia (Mazzoni 2009, 2013), suggesting an eastern origin of the practice. In the EBA Anatolian corpus, four distinct groups can be distinguished based on the shapes and motifs of the seals that impressed the vessels (fig.5.23, for the spatial distribution of different motif types, see figs.5.26-5.27):

Stamps with "Anatolian" motifs:

a) **Im003** from Karataş: despite having no close comparanda, the division in quadrants and the presence of straight lines radiating from the centre suggests its Anatolian character;

b) **Im004** from Poliochni, with common angle-filled cross motif;

c) **Im008** from Troy (also associated with cylinder **Im009**), with common angle-filled cross motif;

d) **Im102** from Gözlükule, with common angle-filled cross motif;

Stamps with "Aegean" motifs:

a) **Im001** from Poliochni, similar to a sealing from Lerna (**CMS V 074**);

b) **Im002** from Poliochni, similar in design with a motif stamped on hearth at Ayia Irini (**CMS V 464**);

c) **Im005** from Troy, very similar to two sealings from Lerna (**CMS V 101-102**) and one from Ayia Irini (**CMS V 462**);

d) **Im006** from Heraion, whose motif is quite similar to a MM Ia seal from Moni Odigitria on Crete (**CMS VS1A 321**), and another one from MBA Gözlükule (Goldman 1956:fig.397.16).

Cylinders with geometric motifs, which are common across the whole Aegean with little variation and represent the 47% of the western Aegean seal-impressed pottery corpus (131 pieces out of 279 recorded in the Arachne database):

a) **Im009** from Troy (associated with **Im008**), with wavy parallel lines;

b) **Im010** from Heraion with zigzag lines;

c) **Im011** from Heraion with zigzag lines;

d) **Im013** from Methymna with rhomboidal pattern;

e) **Im107** from Gözlükule with zigzag lines;

f) **Im109** from Gözlükule with rhomboidal pattern.

Cylinders with figurative motifs, which are likely related to Levantine and Mesopotamian glyptic tradition and are absent in the western Aegean:

a) **Im007** from Poliochni, with combination of anthropomorphic and geometric motifs;

b) **Im012** from Heraion, with an animal procession;

c) **Im100** from Yumuktepe, with a zoomorphic motif (possibly impressed by a Jemdet Nasr seal);

d) **Im110** from Gözlükule, with a zoomorphic and geometric motif;

e) **Im113** from Gözlükule, with procession of human figures.

Visual analysis of fabrics and surface treatments suggest that most vessels described in sufficient detail belong to a manufacturing tradition described as local/regional by the excavator; these include all the pottery impressed with geometric and figurative seals (fig.6.28). This implies that non-Anatolian figurative cylinder seals were in some instances employed to impress locally-produced containers. On the other hand, in the case of motifs with "Aegean" stamps, the vessels in all cases seem imported to the site from Cyclades/mainland Greece, while the "Anatolian" stamp on **Im004** from Poliochni was described as imported to the site, but without a suggested provenance.

In Anatolia, the earliest vessels impressed with stamp seals appear around c.2700-2600 BC, as witnessed by examples from Poliochni Green (**Im001** and **Im002**) and from Gözlükule early "EB II" levels (**Im103-Im105**). Similarly to the sealings, impressed pottery with "Aegean" motifs appear along the eastern Aegean seaboard earlier than in mainland Greece, Cyclades and Crete (in EH IIb, c.2500-2400 BC). The first vessels impressed with cylinder seals occur around 2400-2200 BC at Gözlükule "EB III" levels (**Im106-Im113**) and Poliochni Yellow (**Im007**). They are thus possibly contemporary with mainland Greece (at Lerna IIIC) and with the earliest appearance of stamp-cylinder and cylinder seals in the area.

In the Levant, it is clear that seal impressions on pottery only occur on large transport jars, and only in a few isolated instances there are impressions made by figurative seals (which are normally employed on administrative sealings), while most of the motifs are geometric or floral (Mazzoni 2009, 2013). Detailed analysis carried out at Hassek Höyük showed that stone seals were used on sealings while clay seals were used on pottery, suggesting that the act of impressing seals on pottery might have been conceptually distinct from administrative practices (Mazzoni 2013:197-199).

The typology of western Aegean seals impressed on pottery and hearths (from the ARACHNE database) indicates that in the overwhelming majority of cases (278 out of 279) cylinder seals have very simple geometric motifs, including opposed C-spiral patterns, lozenges and chevrons.[34] They are also on average much bigger (c.2.5-10cm in length) than Mesopotamian cylinder seals (c.1.5-3cm) and were in many cases made of wood or clay (Aruz 2008:20), suggesting a functional difference between the two categories of artefacts. On the other hand, the Aegean stamp seals employed on pottery and hearths are stylistically complex and undistinguishable from those employed on door and container sealings. Though more analysis is needed, this pattern seems to suggest that while in the Aegean (and Anatolia?) cylinder seals might have been employed to decorate large storage jars, the local stamp seals might have been used on specific products as a guarantee of their quality or their origin.

5.2.3 Sealing practices as an index of interaction

The analysis in the previous sections provided a range of observations that together sketch broad patterns of interaction related to sealing practices between Levant/Upper Mesopotamia, Cilicia, west/central Anatolia and the western Aegean. These elements, detailed below, include exchange of finished products (sealed containers, storage jars, seals), mutual influences in the manufacture of sealing devices (in shapes and motifs), diffusion of similar cultural practices (impressing seals on pottery) and episodes of transfer of technological know-how (employing stamping devices for administrative purposes).

5.2.3.1 Circulation of finished products

Even though a detailed analysis of the Cretan, Cycladic and mainland Greek corpus could not be performed, there are several objects with probable Anatolian origin found in the western Aegean. Among these are the polilobate seals that impressed the locally-made pot from Jaltra (**CMS V 202**) and five container sealings from Geraki (G-4, Weingarten et al. 1999:fig.13), that have an almost perfect match in three Anatolian seals from EBA Ahlatlıbel (**St252** and **St255**, fig.5.16.29) and MBA Alişar Höyük (von der Osten 1937b:418, fig.478.e1824). Angle-filled cross and hatched cross motifs, particularly common in Anatolia, are also found on a number of Aegean items, though they cannot safely be attributed to an Anatolian origin. These include the

[34] The only exception is a single cylinder seal with a geometric and zoomorphic motif that impressed pithos and hearths at three different sites: Lerna, Tyrins and Zygouries (**CMS V 20, CMS V 504, CMS V 529**).

container sealings from Geraki (G-17, Weingarten et al.2011:154), Myrtos (**CMS V 020**), and Lerna (**CMS V 048**), a lead seal with angle-filled cross motif from Tsoungiza (**CMS VS1B 128**; Aruz 2008:32), and several seal-impressed pots from Chalandriani (**CMS IS 171**), Lerna (**CMS V 052**) and Skoteini (**CMS V1B 351**).

Three medium-sized storage jars[35] (for liquids such as oil or wine?) found at Poliochni Green and Troy IIb (**Im001, Im002** and **Im005**) bear impressed “Aegean” motifs and are produced in wares that are common in the southern Aegean, and thus can be considered imports at these sites. Three sealings with “Aegean” motifs coming from Karataş IV (**Sg002**), Myrina 5 (**Sg004**) and Troy (**Sg006**) also originate from the Aegean basin. A bone bird-shaped seal found in a rich grave in Bakla Tepe’s “EB III” cemetery (**St069**) has no parallels in inland Anatolia but finds close matches in the group of Cretan zoomorphic seals, and in particular with a piece from Trapeza (**CMS II,1 438**, fig.5.16.47) dated to the EM III/MM Ia period. Also the Limantepe bell-shaped seal (**St075**) seems to find good parallels in several late 3rd millennium seals from Crete, in particular one from Trapeza EM III/MM Ia (**CMS II,1 428**, fig.5.16.49).

There is a much wider range of evidence for possible Levantine or Upper Mesopotamian imports in both Anatolia and Aegean; for instance, the ovoid bulla from Demircihöyük (**Sg001**) is a surprising find, since it has no parallels in EBA. Further, several thousand stamp and cylinder sealings have been found in Kültepe (of which only **Sg104** was cursorily published) in the renewed excavations, but their date (late EBA or early MBA?) is currently unknown. Excluding the Trojan clay cylinders (**Cy003**, **Cy004** and **Cy006**), the majority of cylinder and stamp-cylinder seals found in Anatolia (**Cy001**, **Cy002, Cy005, Cy007, Cy008** and **Cy100-107**) are in all likelihood an import from Upper Mesopotamia/Cilicia. To this list also the cylinders that impressed Poliochni, Heraion and Yuumuktepe pots (**Im007, Im012** and **Im115**), a stone stamp-cylinder from Aliartos (**CMS VS3 380**), and a silver cylinder from Mochlos (Aruz 2008:40) need to be added. The gable seals found in Anatolia (**Os001-Os006** and **Os009**) are also likely originating in Syro-Anatolia or Cilicia, and the same can be said for a seal with a zoomorphic motif that impressed a hearth in Petri (Aruz 2008:19, fig.5).

5.2.3.2 Circulation of motifs and shapes

On top of circulation of finished products, there is substantial evidence for the adaptation of foreign elements into local production practices, for instance visible in the replication and modification of seal shapes and motifs. Interestingly, this process is much more evident in Crete

[35] These vessels are too fragmentary to suggest accurate measurements, but were likely small enough to be transported on a canoe/longboat.

and the western Aegean than in inland Anatolia itself. In Anatolia, EBA local glyptics seem to largely develop from the earlier Chalcolithic traditions and major innovations are recorded only at the transition with the MBA (e.g. appearance of local cylinder seal production, radical changes in iconography including complex geometric motifs, anthropomorphic and zoomorphic figures, changes in stamp seal shapes). In terms of motifs, Aegean and Anatolia are largely distinct, but three main motif types are shared between the two areas: angle-filled cross, hatched cross and grid patterns. In all cases, these are much more common in Anatolia than in mainland Greece, Cyclades or Crete, but they are also so simple (and not limited to Anatolia or to the EBA) that a clear correlation cannot be established with confidence. With regard to mainland Greece, some of the geometric patterns found on cylinders that impressed pottery and hearths have close similarities with Syro-Anatolian ones, particularly the opposed C-spiral and the circle-and-chevron motifs (Aruz 2008:20-22; Mazzoni 2013:198).

In terms of seal shapes, in mainland Greece and even more prominently on Crete, the late 3rd millennium witnesses the introduction of several forms that are not part of the earlier tradition of local stamping devices, but have Levantine and Syro-Anatolian roots. These include pyramidal, hemispheroid, gable, hammer-head stamp cylinder and cylinder seals (cf. Aruz 2008:18-19, 41-42, 62). Many of these objects have typical Aegean motifs indicating a local production that combines foreign seal shapes with local motifs. Others have motifs (e.g. the hatched cross or angle-filled motif) that might suggest an influence from (southern) Anatolia, and include the gables found on Crete at Koumasa (**CMS II,1 155**; **CMS II,1 158**), Maronia (**CMS II,1 421**) and Moni Odigitria (**CMS VS1A 284**), and the stamp-cylinder found in Kapros, made of local green stone (Aruz 2008:35). Neither of these shapes are replicated on local seals in inland Anatolia (and the pyramidal and hemispheroid seals are thoroughly absent), suggesting that the area of contact between the Aegean and the Levantine/Cilician region must lie along the southern Anatolian coast, currently an archaeological terra incognita.

5.2.3.3 Transfer of technological know-how

There have been works suggesting that sealing practices in EBA Anatolia and the Aegean are not the result of independent local development but that the result of technological transfer from the Upper Euphrates, Cilicia and/or Syro-Anatolia (Aruz 2008:14-22; Rahmstorf 2011b:107-110; Webb and Weingarten 2012:100). Administrative practices not only occur in these areas at an earlier period (mid-5th millennium), but also appear in Anatolia contemporary with a horizon of intense interaction between the two sides of the Antitaurus Mountains (section 7.2.3). Further, administrative technology itself is difficult to replicate without intimate knowledge of its mechanisms, and there are very specific similarities between Aegean/Anatolian practices and Mesopotamian ones. These include how doors and containers are locked, the formal disposal of broken sealings for archival purposes, and the employment of seals with motifs that can be easily traced back to an individual or a group.

What is more interesting is to see that, as in the case of the adoption of the potter's wheel (section 5.3), there is a substantial chronological lag (over 1500 years) between the first use of sealings in Cilicia and Syro-Anatolia and the first local sealings in communities further west, despite documented contacts during the Neolithic and Chalcolithic. Furthermore, central Anatolian communities seem to have been sporadically exposed to sealed products, as witnessed by a single sealing at Güvercinkayası (Cappadocia) found in Late Ubaid levels (Gülçur et al.2014:447, fig.9.7). The delay seems rather connected with the fact that sealing practices were adopted in Anatolia and the Aegean only when the degree of social organisation was complex enough to require elaborate mechanisms of goods control and redistribution.

The technological adoption also entailed a significant process of re-elaboration of the concepts. For instance, door sealings (employed for control over stored products) are for the moment exceedingly rare in Anatolia and the Aegean, and are documented in detail only at Lerna; their almost complete absence possibly suggests a simplification of the administrative system. Even in Lerna, Judith Weingarten's analysis of the sealings revealed the absence of a bureaucratic apparatus and a rather simple system (1997:147-148). Further, Anatolian and Aegean sealings are impressed exclusively with stamp seals, and no cylinders are employed until the early 2nd millennium, in contrast with Cilicia, Levant and Syro-Anatolia where a combination of both forms were used. With the exclusion of Demircihöyük's "Mesopotamian" bulla (the earliest in the area), all other sealings are impressed with motifs that can be clearly attributed to regional glyptic traditions. Further, the Anatolian stamp seals clearly develop from earlier local traditions in terms of shapes, materials and motifs. While pre-EBA stamps were clearly not intended for sealing, their function was probably conceptually close enough that the two separated actions (stamping on skin/clothing and stamping on a sealing) could be associated in the use of the same or similar tools. Intriguingly, as is in the case of metrology, the Aegean basin seems to show a higher degree of innovativeness than inland Anatolia in terms of elaborating new motifs. With few exceptions, the complex designs on sealings have no comparanda with earlier mainland Greece pintaderas or with other areas, and seem to be a local mid-EBA innovation. The same can be said for the extensive re-elaboration of Levantine/Cilician forms such as gables, hemispheroid, and pyramidal seals during the late EBA, which have no counterpart in Anatolian local production.

While the scarcity of finds does not allow us to trace in detail the diffusion of the technology from east to west, there seems to be little doubt that the earliest Anatolian sealings are a couple of centuries earlier than in the western Aegean. The western and southern Anatolian coasts are probably the areas that mediated the knowledge transfer into the Aegean, a hypothesis already suggested by others but not explored in detail (e.g. Aruz 2008:11; Weingarten 1997:147). Additionally, sealings and seal-impressed pottery with “Aegean” motifs occur along the eastern Aegean seaboard earlier than in the west (at Poliochni Blue/Green, Myrina and Karataş IV). Despite the low number of pieces, this may hint that some of the characteristic motifs of what we call “Aegean glyptic” are in fact originating from the western Anatolian coast.

The extant evidence from container sealings only provides hints that the sites were in contact with communities that were sealing particular products. However, the absence of door sealings (that would confirm without doubt on-site sealing activities) makes difficult to assess in detail the social context in which administrative practices were first adopted in Anatolia. What seems clear is that, with very few exceptions (e.g. Demircihöyük), non-local seals and sealings are found in elite contexts, where one would expect them to be. However, assuming that the size of a community can, to some extent, be taken as an indicator of the degree of social complexity at the local level (cf. Mac Sweeney 2004), then we can spot important differences among the different areas included in this analysis. Sealing-bearing sites in Cappadocia and the Kızılırmak bend are on average much larger (c.15-40ha: Alacahöyük, Alişar Höyük, Kültepe, Yassıhöyük) than their counterparts in western Anatolia (c.0.3-10ha: Demircihöyük, Bademağacı, Seyitömer, Karataş, Heraion, Poliochni, Troy), and even more so in comparison to western Aegean sites (e.g. Lerna, Petri, Geraki, Tiryns, Ayia Irini, a few hectares at the most). Tentatively, one can employ this rough proxy to suggest that the scale of administrative control for production, storage and redistribution of goods might have been smaller among Aegean and western Anatolian communities than those in central Anatolia and areas further east.

As a last remark, glyptic production in central Anatolia seems to have witnessed a sharp break between the latest 3rd and earliest 2nd millennia, though the scarcity of well-stratified contexts does not allow us to understand in detail how abrupt this change might have been. While stamp seals are still employed, cylinder seals with local “Anatolian” or “Cappadocian” styles start to be used for sealing (Özgüç N 1989; Özgüç N and Tunca 2001). Even though some of the MBA stamps have motifs that remind one of earlier pieces, most of the new seals show complex and figurative iconography (zoomorphic and anthropomorphic) that clearly draws from the Upper Mesopotamian tradition. Furthermore, in all the largest and best preserved archives of the Old Assyrian Colony Period (c.1950-1740 BC) the percentage of sealings with EBA-reminiscent motifs is extremely small, approximately 0.2-2% at Konya-Karahöyük, Kültepe, Acemhöyük and Alişar Höyük (fig.5.29). This suggests a new episode of knowledge transfer, related not only to new shapes and motifs, but also to new practices (door sealing, archives of contracts and correspondence) and to radically new approaches of seal manufacture. This process was most likely connected with the more direct contacts between the central plateau and Upper Mesopotamia and the significant presence of foreign traders in Anatolia.

5.3 The potter’s wheel in EBA Anatolia

Recent research by Murat Türkteki has done a great deal to shed light on the little-understood phenomenon of adoption of the potter's wheel in Anatolia (2010, 2012, 2013, 2014). According to his results, the technological knowledge was first acquired around 2400 BC on the central plateau, in all likelihood from regions east of the Taurus mountains where wheel-made pottery had been produced already for over a millennium, and then quickly spread towards north-west Anatolia and subsequently to the Aegean basin. His typological analysis of numerous EBA pottery assemblages also suggests that wheelmade pottery is tightly associated with a specific set of shapes and a limited range of fabric and surface treatments (Türkteki 2010, 2013). Further, his X-ray analysis of Küllüoba pottery indicates that most of the "wheelmade" pots were probably produced with a combination of hand-made (e.g. coiling) and wheel-made techniques; the only exceptions are represented by small, simple-profile open vessels that were entirely thrown on the wheel (Türkteki 2014; also Knappett 1999 for MBA Crete). The following analysis intends to expand this corpus of results, exploring the process of adoption and assimilation of the technological know-how in Anatolia and the social context in which it occurred, and addressing the possibility that it might have been connected with contemporary increase of craft specialisation. It further aims at providing a more detailed understanding of the different steps in the acquisition of the technology at a regional level, shedding light on the possible axes of movement followed by its diffusion.

5.3.1 Analytical limitations

With the exclusion of Türkteki's work, there has been very little research on the wider phenomenon of wheelmade pottery in EBA Anatolia, and even well-published excavation reports of "stratigraphic pillars" like Beycesultan and Troy do not provide comprehensive treatment on the topic. Similarly, broader studies on EBA Anatolian pottery assemblages do not provide significant analytical insight regarding occurrence, proportions and shapes of wheelmade pottery at individual sites (e.g. Abay 1997; Huot 1982; Orthmann 1963a).

This lack of systematic research reflects the general scarcity of detailed pottery studies in the area: out of c.65 excavated sites with a documented occupation spanning the later EBA, only 29 have a basic assessment of the ceramic findings. Even less (16) have explicit assessment of wheelmade pottery, and only a few have a comprehensive pottery catalogue. Only the assemblages of Aphrodisias and Küllüoba were treated statistically by their analysts, and thus only the published results from these two sites can be trusted to roughly reflect real patterns. In all other cases, it is impossible to establish whether the ratio of published wheel/hand-made sherds is a reflection of that of the whole assemblage or there are biases in how each technological class is represented in the final report. For this reason, percentages of wheelmade pottery discussed below should be treated with caution. Furthermore, only for Karataş and Kanlıgeçit a basic intra-site distribution analysis of wheelmade pottery has been performed, otherwise often little or no information is provided about the finding context or the associated assemblages. With very few exceptions, there is insufficient photographic and drawing documentation, so one has to rely on the published report for the identification of wheelmade pots. Furthermore, there is very little published research on micro- and macro-scopic provenance analysis, and this is essentially restricted to Küllüoba (visual fabric analysis, Türkteki 2010), Karataş (petrography, Eslick 2009:285-294), Kaman Kalehöyük (petrography, Bong et al.2010) and a concise publication on the Aegean “Kastri group” (petrography, Day et al.2008). As such, in most publications the origin of pottery at each settlement is assumed on typological grounds, thus preventing to have a clear idea of exchange dynamics at a local and regional level. Lastly, there is an almost total absence of published data for central Anatolia (section 1.7.2), including sites like Konya-Karahöyük, Acemhöyük and Kültepe that likely had a key role in the process of adoption and further re-transmission of the potter's wheel technology.

5.3.2 The EBA Anatolian dataset

The analysis includes all published excavated west and central Anatolian sites with a known occupation between 2400-1950 BC and sufficient published information (23 in total, fig. 5.30). Whenever possible, the first on-site occurrence of local wheelmade pottery was contextualised within the local stratigraphy and the regional pottery chrono-typological sequence (fig. 5.32). In order to integrate data with different resolutions, a semi-quantitative approach was employed, retaining more accurate data when available. For each site, the ratio between wheel- and hand-made pottery was calculated from published find catalogues or the excavator’s accounts, together with the range and proportion of wheelmade shapes (fig. 5.31). Whenever feasible, the associated context (small/large site, domestic/public buildings, workshops, poor/wealthy cemetery) was also recorded. While it is not possible to describe in detail the assemblages of each site, after a general assessment of central and western Anatolian wheelmade assemblages the most important sites will be discussed.

Until very recently, the vast majority of reports on pottery assemblages in EBA Anatolia implicitly or explicitly connected the presence of wheel-marks on vessels with the use of fast wheel technology. However, studies on contemporary Aegean and Levantine contexts indicate that, until the early 1st millennium BC, wheelmade pottery was exclusively manufactured with different types of slow wheel, also called tournette (fig. 5.33, Berg 2013:116-117; Choleva 2012; Fiaccavento 2013; Roux 2009a). Experimental analysis with modern tournette replicas suggests that only small pots (less than 1kg) could have been produced entirely on the wheel (i.e. wheel-thrown), whilst the majority of wheelmade pottery was instead first shaped by hand and only subsequently finished on the wheel (i.e. wheel-coiled or wheel-shaped, Roux and de Miroschedji 2009). The only detailed technological analysis on EBA Anatolian assemblages confirms the results coming from adjacent areas. At Küllüoba, with the exclusion of small simple-profile open vessels (depa and plates) that were wheel-thrown, most wheelmade shapes were fashioned with hybrid hand-made and wheel-made techniques (Türkteki 2014). At Karataş, many of the pots were likely wheel-shaped rather than wheel-thrown, and some handmade vessels were rim-finished on the wheel (Eslick 2009:5).

Throughout the late EBA, the main wheelmade shapes across west and central Anatolia are essentially restricted to tableware, a trend that has precise parallels in the Levant and the Aegean (Choleva 2012; Roux 2009b; Türkteki 2010). In most sites, the vast majority is represented by plates, followed by bowls and drinking vessels (depa, tankards, bell-cups), with a much lower proportion of pouring vessels. Only at two sites (Troy and Küllüoba) there is a wider range of shapes, including small jars, lids and amphorae (fig. 5.31). This trend can be explained by the size limit imposed by the tournette, whose low rotatory kinetic energy only allowed the production of smaller shapes: for example at Küllüoba handmade plates reach up to 50cm in diameter, but wheelmade plates seem limited to sizes up to 22cm (Türkteki 2010:77). While depas cups, bell-cups, tankards, plates and cut-away-spouted jugs occur across a very large area (including the Aegean and Upper Mesopotamia), they are characterised by clear regional differences detectable in shape variations, fabrics, surface treatments and decorations (Choleva 2012; Ezer 2013; Mallegni and Vacca 2013:210-211; Şahoğlu 2014). A common element seems however represented by their tight connection with red-coated and plain wares, the latter almost exclusively associated with wheelmade production (e.g. Blegen et al. 1950:221-222; Türkteki 2010). All wheelmade forms have precise parallels with handmade counterparts, but the former tend to be more regularly shaped, with a symmetric axis, thinner walls and more regular surfaces; in some cases, there is a clear attempt to imitate metal vessels, for example in the use of red-coating (imitating copper surfaces) and fluting decoration.

5.3.3 Temporal and spatial distribution

Based on the earliest occurrence of wheelmade pottery in different areas, it seems possible to distinguish four main phases in the westward diffusion of the potter's wheel technology. In the first phase, the earliest locally-made wheelmade pottery occurs almost simultaneously (in archaeological terms) at Kültepe 13, Küllüoba IIIC, Troy IIc and Karataş VI:1, a horizon dateable to c.2400 BC (figs.5.32, 5.34). With the available evidence, Kültepe is the only site significantly exposed to imported wheelmade pots before the local acquisition of the potter's wheel. For instance, in level 15 (c.2600-2500 BC) the site yields the earliest wheelmade vessels in Anatolia, the so-called globular "Syrian" bottles, which based on surface treatment and fabric can be considered true Upper Mesopotamian imports (Özgüç T 1986:37). In the following level 14, and in the absence of recognisable imported shapes elsewhere on the plateau, a wider range of Upper Mesopotamian wheelmade "Metallic Wares" (including “Syrian” bottles, small jars and beakers) is present on site, together with local imitations of the same pots[36] (Özgüç T 1986:37-38). Level 13 (c.2400-2300 BC) witnesses the first occurrence of non-Mesopotamian wheelmade pottery, represented by plates and double-handled tankards, the latter clearly characterised by local shapes (Kontani 1995:112; Özgüç T 1986:39). In the same level, the new excavations retrieved hundreds of depa fragments from the large monumental complex, characterised by local Red-on-Cream painted decoration (Ezer 2014). This strongly suggests that Kültepe was in fact among the first sites west of the Taurus mountains to produce local wheelmade pottery, and thus one of the most likely centres involved in the adoption and re-transmission of the wheel technology further west.

At Küllüoba, where both a fine-tuned stratigraphy and a detailed statistical assessment of the assemblages is provided, it seems clear that the early stages are characterised by very low quantities of wheelmade pottery, between 3% in level IIIC (c.2400 BC) and c.20% in level IIA (c.1950 BC, Türkteki 2012:66-70; Murat Türkteki pers.comm.). Despite the extensive publication record, the Trojan dataset is rather problematic, since publications never clearly state the ratios of wheelmade pottery. However, the earliest well-stratified occurrence is documented in Troy IIc (Frirdich 1997), and Blegen's typological assessment indicates that in Troy II levels wheelmade pottery comprises a significant portion of a wide range of shapes (Blegen et al.1950:224-240). At Karataş, wheelmade pottery occurs in levels VI:1/2, where 11% of the 55 (sic) published vessels are made on the wheel, although the author admits that the percentage of wheelmade pottery may be underestimated because of the thick slip or surface smoothing (Eslick 2009:169-176). While very little material from Acemhöyük is published, level IV has been recently dated by several short-lived radiocarbon samples to c.2080-1970 cal BC (Öztan and Arbuckle 2013:282), suggesting that levels IV-XI all belong to the later EBA sequence. In the earliest excavated level XI, several fragments of thin-walled Red-Coated tankards were found (Öztan and Arbuckle 2013:280). In the following level X, attributed by the

[36] The manufacturing technique of these local copies is not specified in the publication.

excavator to the latest "EB II" layers, an intramural grave yielded a wheelmade plate that bears similarities with those from Kültepe (Öztan 1989:409, fig.40; Türkteki 2010:120). Another grave yielded a handmade one-handled tankard together with a wheelmade two-handled tankard (Özgüç T 1986:41, fig. 3.34). The closed context can be dated early in the “EB III” sequence, since very close parallels for the two-handled tankard are found in Karataş VI:1, c.2400-2300 BC (Eslick 2009:pl.52-KA160; Warner 1994:pl.165-KA332), and for the one-handled tankard a very similar specimen can be found in Demircihöyük-Sarıket grave 317, dated c.2600-2550 BC (Seeher 2000:fig.38). Given the scantiness of the published data and the flimsiness on the stratigraphic information, one can only tentatively suggest that Acemhöyük's wheelmade pottery may well have been local, and may have been contemporary with Kültepe.

In the second phase (c.2300-2200 BC), wheelmade pottery starts appearing in the northern part of the central plateau, e.g. in Polatlı where levels 8-9 (c.2300-2200 BC) yield modest quantities of wheelmade pottery, that increase to c.10% in levels 10-15 (c.2200-1950 BC, Lloyd and Gökçe 1951:33-34). At Kanlıgeçit (eastern Thrace), small ratios of wheelmade pottery (on Red-Coated Wares) appear suddenly in phase KG2c, after the destruction of the previous settlement - a typical Balkan village with wattle and daub structures- and the building of an “Anatolianizing” fortified site. Phase KG2c is dated around 2300 cal BC by several radiocarbon samples (Özdoğan and Parzinger 2012:table 64). At Poliochni, the Yellow period (c.2400-2200 BC) is characterised by an almost complete change with respect to earlier phases, represented by higher-quality fabrics, higher firing temperatures, thinner walls, appearance of plain and red-coated wares, and new pottery shapes (Bernabo' Brea 1976:249-251). During this phase, wheelmade vessels are represented in small quantities, but during period Brown 1 (contemporary with Troy IV, hence c.2100-1950 BC) wheelmade ratios reach up to 20% (Cultraro 2007:327). The spread of the potter's wheel technology in the Gediz-Büyük Menderes triangle is currently not well understood, since two of its main centres (Beycesultan and Kusura) present an occupation hiatus during the period c.2500-2100 BC. When archaeological record is again available, wheelmade pottery is already present at both sites, and 14% of the published sherds of Beycesultan levels XII-X (c.2100-1950 BC) appear to be produced on the wheel (Lloyd and Mellaart 1962:210-214). The chronological sequence of Aphrodisias, further downstream, is generally problematic. Even though wheelmade pottery occurs at the site as early as Acropolis Trench 3 complex VII and continues to be present in the following architectural phases (notably in complex V, where two stacks of wheelmade plates were found *in situ*), a secure date cannot be securely established before Acropolis Trenches 3-4 complex II, dated by both pottery parallels and a set of radiocarbon dates to c.2210-2050 cal BC (Sharp-Joukowsky 1986:88-89, 163, 169). Despite the difficulty in correlating Aphrodisias' stratigraphy with regional chronological sequences, a general statistical assessment of the pottery suggests that, towards the end of the EBA, wheelmade production ranges between 25% and 40%, and steadily increases in the 2^{nd} millennium, with ratios of 72% and 84% for the MBA and LBA phases respectively (Sharp-Joukowsky 1986:358-367). On the Aegean coast, Limantepe level B V-1a (roughly contemporary with late Troy II levels) yields small quantities of wheelmade plates and bowls co-occurring with the appearance of Red-Coated wares typical of inland Anatolia (Şahoğlu 2002). These developments are contemporarily with similar findings at nearby Emporio I (Hood 1982:134, 169, 175, 545), Heraion III (Milojcic 1961:45) and Ulucak Höyük (Çilingiroğlu et al.2004:15).

The third phase, dated c.2200-2100 BC, sees the spread of potter's wheel technology at numerous sites in the western Aegean, closely connected with a number of shapes and surface treatments typical of western Anatolia that suggest this area as the proximate origin of the technology (Choleva 2012; Day et al.2008; Türkteki 2010). On top of Red-Coated Wares of Anatolian influence, wheelmade production on shapes like the Bass bowl and local wares prove a local manufacture (Choleva 2012). At Lerna IV (c.2200-2000 BC), one of the best documented contexts, wheelmade pottery represents 2.5% of the total assemblage, and similar low ratios seem to characterise most of the other sites in the western Aegean. This suggests that, even at the turn of the 2^{nd} millennium, wheelmade production in the area is rather limited (Berg 2013; Choleva 2012:371; Crewe and Knappett 2012).

The fourth phase spans c.2100-1950 BC and sees the adoption of the potter's wheel within the Kızılırmak bend (the later Hittite heartland). While published data from this area are generally scanty and most of the sites have not been excavated beyond the latest EBA phases, the stratigraphic sequences of Alişar Höyük and Alacahöyük confirm the absence of wheelmade production before the latest 3^{rd} millennium. Alişar Höyük 6M (c.2100-2000 BC) is roughly contemporary with the appearance of the so-called "Alişar III Intermediate Ware" and yields only a few wheelmade sherds. "*Many fragments of monochrome wheelmade ware*" were found in level 5M, dated to the earliest 2^{nd} millennium, while by level 4 (MBA) the vast majority of the pottery is made on the wheel (von der Osten 1937a:208, 230; 1937b:110). At Alacahöyük, wheelmade pottery occurs in level 5, before the appearance of "Alişar III Intermediate Ware", and becomes a significant proportion of the overall assemblage by level 4a, contemporary with Kültepe karum IV and dated to the latest 3^{rd} and earliest 2^{nd} millennia (Gürsan-Salzmann 1992:13, 28, 38, 109-110, 243). A very similar trend is witnessed in the earliest levels of Boğazköy (9 and 8d-c), founded on virgin soil and dateable to c.2050-1950 BC (in parallel with Kültepe karum IV-III). Both levels yielded "Alişar III Intermediate Ware" and substantial quantities (32% in level 9 and 49% in levels 8d-c) of wheelmade pottery, essentially composed by jugs and bowls (Orthmann 1963b:14-37). By level 8b, (Kültepe karum II) c.90% of the pottery is wheelmade. Again, a close parallel for both Alacahöyük and Boğazköy can be found at Kaman Kalehöyük, where the earliest excavated layer (level IVb, contemporary with Kültepe 11), shows the first appearance of some wheelmade sherds, while level IVa (contemporary with Kültepe karum IV-III) already has 50% of the pottery assemblage made on the wheel (Omura S 2000:28; Omura S 2002:20-30). A detailed technological analysis of the assemblage also indicates that firing temperatures and clay quality dramatically improve between level IVb and level IIIc (the earliest MBA layer), together with a shift in surface treatments (Bong et al.2010).

5.3.4 Production and consumption of EBA wheelmade pottery

An important clue concerning the organisation of pottery manufacture is provided by Seyitömer Höyük, an extensively excavated small (2-3ha) site in inland western Anatolia. Here, a burnt room at the outskirts of the settlement dated to the “late EB II” (c.2600-2500 BC, prior to local wheelmade pottery production) contained some 50 whole vessels and clay and stone moulds employed in their manufacture (Çakalgöz 2000:156). Recent excavations at the site also found a small complex in level V-B with several kilns, pottery moulds and large numbers of handmade pottery, including depa (Bilgen et al.2013:205). While neither context is published in detail, the archaeological evidence nonetheless suggests the presence of specialised handmade pottery workshops at the site. The earlier example is particularly important because it shows that specialised potters may have operated in Anatolia before the diffusion of the potter’s wheel technology, also within smaller settlements. A further indication is provided by the (scantily published) site of Kumyer Mevkii near the Aegean coast, dated broadly to the late 3rd millennium. Here, seven large kilns (c.3.2x2.7m) were found just outside the graveyard (Tırpan and Gider 2011:386-387), strongly suggesting that the large burial pithoi employed in the cemetery may have been produced in the area immediately adjacent to it and within structures that were specifically dedicated to their manufacture. A similarly-sized kiln was found in Karataş, where it was suggested to belong to a pithos-production facility (Warner 1994:187). In fact, most of the EBA western Anatolian cemeteries yield pithoi often up to 2-2.5m high and 1-1.5m wide (Massa 2014b:78), whose production would have required both a skilled craftsman and a kiln large enough to fire them. This further suggests that their manufacture may have been relatively widespread across many different settlements, since it would have been impractical to move them over large distances. While no specialised wheelmade pottery workshops have so far been contextually documented in west and central Anatolia, the finding of the ten tournette fragments within the Trojan "citadel" (Dörpfeld 1902:390) suggests that, at least in this case, wheelmade production may have been closely connected with elite buildings.

In no instance have we the possibility to compare two well-published datasets from contemporary nearby sites, or compare different areas within the same site in order to assess differential access to wheelmade pottery. It would however be incorrect to attribute its production and consumption exclusively to the elite sphere. It is true that most wheelmade shapes belong to tableware and are possibly related to communal feasting, and are often concentrated within public/monumental areas (e.g. at Kültepe, Küllüoba, Kanlıgeçit, Troy and Limantepe). However, they also occur in small sites, in domestic contexts and often in the same (archaeological) time span as nearby bigger centres (e.g. at Karataş, Kaklık Mevkii, Ulucak Höyük). Particularly poignant is the case of Karataş, where already when it first occurs (level VI:1) wheelmade pottery is found in almost every household (fig.4.16b, Eslick 2009:233).[37] While excavated mostly around the "citadel", a similar case can be argued for Kanlıgeçit, where Red-Coated Wares and wheelmade plates are found also in the lower settlement (Özdoğan and Parzinger 2012).

5.3.5 The adoption of the potter's wheel in EBA Anatolia

Several studies in the Aegean and Near East have stressed that the potter's wheel technology is not easily replicable independently, and that familiarity only with the finished products does not allow understanding the manufacturing process (Choleva 2012:375; Knappett 1999:125). These observations may help contextualising the adoption of the slow wheel in Anatolia at around 2400 BC, a century or more after the first appearance of imported wheelmade vessels at Kültepe levels 15-14, and at a time when contacts with adjacent regions to the south-east have already considerably intensified (section 7.2.3). Both Upper Mesopotamia and Cilicia were employing the tournette already by the early 4th millennium, e.g. at Gözlükule, Yumuktepe, Arslantepe, Amuq valley, Yarım Höyük and Hacınebi (Braidwood and Braidwood 1960:229-243; D'Anna and Guarino 2012; Garstang 1953:164-198; Goldman 1956:76, 83, 87; Kozbe and Rothman 2005; Rothmann et al.1998; Stein et al.1998). Thus, it seems possible to argue that the appearance of locally-produced wheelmade pottery on the central plateau occurred in a context of technological transmission rather than independent innovation. Three main routes may have been facilitated the diffusion of the potter's wheel from Syro-Cilicia into central Anatolia (fig.5.35):

a) the route connecting Gözlükule with Kemerhisar via the Cilician Gates;

b) the route between Kültepe and Danişmen, following the Kahramanmaraş valley and passing by the important site of Göksun, with possible alternative paths within the Antitaurus Mountains;

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[37] However, contemporary phases of the Central Complex are not known and the relative density of finds between domestic and public contexts cannot be compared.

c) the route from the Malatya plain (Arslantepe) to Kültepe, passing through the Elbistan plain and its main site Karahöyük.

There is at present very little evidence of contacts between central Anatolia and the eastern highlands, probably also because of very limited analytical work on the subject. However, a survey of the Elbistan plain shows the presence of late EBA Upper Mesopotamian, Cilician and central Anatolian wares (Amuq I, Alişar III painted ware, black-topped wares) both at Göksun and Karahöyük-Elbistan among others, suggesting the role of the area as crossroads between these regions (Brown 1967:124, 130-131).

Interestingly, as with sealing practices, a delay of c.1500 years occurred between the local use of the tournette in Cilicia/Syro-Anatolia and in the central Anatolian plateau, despite the existence of earlier contacts and despite close spatial proximity (between 110 and 230km across the Taurus mountains). Equally important is the delay in the adoption of the wheel within the Kızılırmak bend, c.300 years later than in surrounding areas to the south and west. It is also striking that, once acquired by communities on the central plateau, the technology very quickly spread to western Anatolia (e.g. to Troy and Karataş) covering c.800km in the span of a few generations at the most (fig. 5.34). These patterns may be related to a change in modes of pottery production within the Anatolian communities, and particularly may be connected with the appearance of specialised potters, that were present in the area at least a couple of centuries prior to the introduction of the potter's wheel. Further hints of specialised artisanship come from the notion that wheel-coiling, wheel-shaping and wheel-throwing require a set of totally new skills that need considerable time to acquire and that thus point to extensive contacts between potters, likely within a context of apprenticeship (Berg 2013:117; Knappett 1999:125). Additionally, in EBA Anatolia as well as in contemporary southern Levant and western Aegean, wheelmade assemblages are in most cases limited to drinking, pouring and serving vessels, hinting at specialisation of the products. All these elements strongly suggest that in Anatolia, as in the Aegean and the Levant, wheelmade manufacture may have occurred within the context of specialised pottery workshops (Berg 2013; Eslick 2009:233; Day et al.2008:337). This hypothesis is further strengthened by the very rapid spread of the technological know-how across the area, that contrasts with the assumed time necessary for the acquisition of the technique (suggested to be up to 5-10 years, Berg 2013:117). A wave diffusion (cf. section 2.3.4) from household to household, from village to village, is thus not very plausible, and it is instead more probable that technology transfer occurred between specialists, possibly located in the larger centres, that subsequently mediated the diffusion of the know-how at the local scale (“dendritic diffusion”).

A tight connection between wheelmade production and elite consumption can also be proposed. While it does not occur only in elite contexts, the shapes associated with wheelmade pottery –

represented essentially by a set of drinking and dining vessels- seem nonetheless to point to the sphere of communal drinking and collective gatherings (Bachhuber 2009; Düring 2011b:258). At numerous late EBA sites (e.g. Küllüoba, Troy, Kanlıgeçit and Limantepe) large numbers of pits that included substantial percentages of wheelmade depa, tankards, plates, jugs and animal bones were found within or adjacent to public buildings, suggesting ritual feasting connected with elite activities (Bachhuber 2009; Kouka 2011; Özdoğan and Parzinger 2012:35-37; Türkteki 2010:133). While most specialised potters were probably not under a centralised control, one can speculate that a significant portion of their production may have been directed to the needs of the elites. This link is also indirectly confirmed by the coincidence between the earliest occurrence of locally-produced wheelmade pottery and the emergence of stratified societies in the different areas under analysis. It is certainly the case for central and western Anatolia, where the adoption of the technology at c.2400 BC is contemporary with extensive evidence for a steady increase of social complexity (section 1.5). The same case can be suggested for the Kızılırmak bend, where its introduction at c.2100-1950 BC coincides with a process of social re-structuring witnessed for example by the foundation of large sites like Büklükkale and Boğazköy/Hattusa, the construction of a very large public complex at Yassıhöyük, and the building of a large fortification system encircling the lower town of Alişar Höyük. Similar trends can be followed also on Crete, where the potter's wheel is adopted in MM IB (c.1900 BC) in concomitance with the emergence of palatial entities on the island (Crewe and Knappett 2012:177-178; Knappett 1999). Lastly, in the southern Levant (where the potter's wheel is employed since the late 5th millennium) wheelmade production seems to cease altogether in concomitance with collapse of complex societies both at the end of the 4th and the 3rd millennia (Roux 2009b; Roux and de Miroschedji 2009).

5.4 Technological transfers in Anatolia: some preliminary remarks

In light of the analyses presented above, there are some preliminary conclusions that can be drawn: for instance, there is substantial evidence that contacts with Syro-Anatolia were already established at least by c.2800 BC,[38] i.e. several hundred years before the traditionally-accepted date (Efe 2007; Şahoğlu 2005). The areas where exchanges would have been more intense are

[38] If not earlier: at the moment there are very few well-published and extensively-excavated early EBA sites across west/central Anatolia, and little is known for the whole central plateau before 2400 BC (section 1.7.2).

Cappadocia, the Konya-Karaman plains and the southern Anatolian coast, all of which are however an archaeological *terra incognita* for most of the EBA.

From all three case studies presented here, it seems quite clear that a phase of exposure to the technology (through reception of finished products at least) was not followed by its immediate adoption within the recipient communities: several millennia in the case of sealing practices, some 1500 years for the potter’s wheel, probably a few hundred years for metrology. It can be argued that these technologies would have been employed by western/central Anatolian communities only when needed, i.e. in a phase of rapid increase of socio-economic complexity and in contexts where higher levels of specialisation (in craftsmanship, in administrative control and in circulation of goods) had been attained.

It is also clear that these episodes of technological transfer entailed, to various degrees, a process of adaptation to fit local socio-economic, political and cultural contexts. It is most evident in the case of the Aegean balance weights, where the Levantine unit of measure was kept, but a new shape, the spool, was created. It is also visible in the adoption of the potter’s wheel, whose employment in Anatolia produced ceramic shapes that had very little in common with the areas where the technology originated. And finally, sealing practices in EBA Anatolia seem, at least with the available data, a simplified version of the Mesopotamian practices, in that there is no clear evidence for door sealings and occur in a much less developed administrative context. Furthermore, the act of sealing in Anatolia was carried out with stamp seals that had simple motifs stemming from earlier, local traditions (“pintaderas”) rather than with seals (both stamps and cylinders) with complex figurative motifs associated with the plausible areas of origin.

Lastly, all three case studies gathered substantial evidence that coastal Anatolia played a key role in the diffusion of technological know-how to communities living further west in the Aegean basin, something that had been extensively recognised only in relation to the introduction of the potter’s wheel (in the late “Kastri/Lefkandi I” phase, section 7.2.1). The analyses above have clearly shown that both Aegean-type sealings and spool weights occur along the eastern Aegean seaboard earlier than in Crete, the Cyclades and the Greek mainland, suggesting that the process of re-elaboration and adaptation of metrology and sealing practices may have occurred in coastal Anatolia rather than further west.

Chapter 6. Procurement and exchange of natural resources: obsidian and metal

The introduction of wheeled carts and larger boats in the early 3rd millennium and of the donkey several centuries later (section 3.1) allowed people, for the first time in Anatolian history, to move substantial quantities of materials across large distances, thus significantly increasing the range and the quantity of goods that it was possible to exchange. While all of these carriers were likely to be expensive to acquire and maintain, and therefore probably restricted to a limited number of users, they certainly had a long-lasting impact on how goods were circulating during the EBA and following periods. Among these goods, natural resources certainly played an important role in exchange networks at different scales. Apart from those that have been subject to more detailed research (obsidian and metal), there is a range of others that were in all likelihood circulating already during the 3rd millennium, including marble, salt, flint, different varieties of ground stone, and semi-precious stones (e.g. carnelian/sard, amethyst, rock crystal). The aim of this chapter is to analyse how some of these resources were exchanged during the 3rd millennium, looking in particular at how their exploitation and circulation were organised, the extent of their networks and the role of individual sites.

The two case studies presented here focus on obsidian and metal (gold, silver, copper and tin); while certainly representing some of the most important Anatolian resources, their selection was also constrained by the availability of previous research on the subject. Metallurgy is among the best investigated topics in EBA Anatolian studies, and so is the characterisation of obsidian exchanges, though arguably much less has been done for the EBA evidence when compared to earlier Neolithic and Chalcolithic periods. However, despite their importance, none of the other categories of raw materials has so far received substantial analytical treatment, and could not be included here. Thus, it needs to be stressed that the selected case studies represent only a portion of all potential raw materials exchanged during the EBA: in particular, as it will be shown below, they allow us to look into more detail at mechanisms of regional and interregional exchanges, but unfortunately not at exchanges on a local level (i.e. the valley-system scale), that were however arguably representing the majority of interaction events.

6.1 Obsidian in EBA Anatolia

The following analysis aims at reconstructing possible models of how exchange was organised and who were the individuals likely involved in the circulation of obsidian, looking at the overall ratio of obsidian versus locally-accessible materials, the form in which obsidian reached a settlement, and where the obsidian came from. While substantial research has been conducted on Neolithic and Chalcolithic lithic assemblages and their pattern of distribution and consumption, by comparison the EBA is little explored. Most of the research has been published in preliminary reports with widely varying degrees of detail regarding the overall size of the studied assemblage and basic statistics about raw materials employed and artefact typology. At present, there are few detailed site-specific assessments, mainly concentrated in western Anatolia, and there is no synthetic regional study on the subject. This analysis thus represents the first attempt to fit the different data together, and focuses on 35 Anatolian sites with at least a preliminary study of the chipped stone assemblage; limited numbers of western Aegean sites are also used for comparison in the analytical section. The dataset includes information on the level of detail of each lithic study report, the size of the chipped stone assemblage, the ratio of obsidian versus other raw materials, the presence/absence of corticated/decorticated cores, the distance of each site from the closest known obsidian sources,[39] and provenance of obsidian samples (figs.6.1-6.2).

6.1.1 Obsidian sources and provenance analysis

There are several obsidian sources in Anatolia and the Aegean, whose products vary in accessibility, size of raw nodules, knapping quality, appearance and chemical composition (Chataigner 1998; Delerue 2007 among others). These sources have distinct histories of exploitation, with some of these rarely or never used in prehistory. For example Foça on the Aegean coast and Hasan Dağ in Cappadocia never seem to have been used, possibly due to their poor knapping qualities and inaccessibility respectively (Carter 2009:199-201; Poidevin 1998), while others like Antiparos and Yali in the Aegean, plus Sakaeli-Orta, Yağlar, Kalabak and "Galatia X" in northern Anatolia, seem to have been only used only by nearby communities (Badalyan et al.2004; Bergner et al. 2009; Bigazzi et al.1998; Carter 2009:199-201; Chataigner et al.1998). In contrast, the various obsidian outcrops on Melos (Aegean), East Göllü Dağ and Nenezi Dağ (central Anatolia, EGN/ND henceforth), plus Bingöl, Nemrut Dağ and Meydan Dağ (eastern Anatolia), were all exploited at distance over wide areas and significant time periods, in many cases from the Upper-/Epi-Palaeolithic to LBA (Carter 2009; Chataigner 1998; Delerue 2007). Our ability to map the distribution of these products, both in the form of raw materials and finished artefacts, is through 50 years of obsidian sourcing studies. These analyses involve (a) determining a source-specific chemical signature, then (b) matching the elemental ‘fingerprints’ of an artefact’s raw material with that of a known geological source (cf.Pollard and Heron 2008; Renfrew et al.1966, 1968 among others). A number of techniques have been

[39] Distance from source is calculated on the actual path of the proposed sea and land routes sketched in sections 3.2-3.3, and not on straight, as-the-crow-flies measure.

used in Eastern Mediterranean obsidian sourcing studies with the recent turn to non-destructive techniques, not least various forms of x-ray fluorescence spectroscopy (XRF) and Scanning Electron Microscopy (cf. Milić 2014 for recent review). Visual discrimination of obsidian source products has also shown to be successful in certain contexts (Milić et al.2013), but it remains a problematic technique (cf. Moholy-Nagy 2003).

6.1.2 Obsidian versus other chipped stone materials

The first step of the analysis was to assess the proportion of obsidian versus other raw materials (e.g. flint, chert, chalcedony, jasper) within the lithic assemblages of the analysed sites (fig.6.3). In central Anatolia, the picture is blurred by the lack of detailed studies at most main centres (e.g. Alacahöyük, Alişar Höyük, Eskiyapar, Kültepe, Yassıhöyük); while there is evidence that obsidian reached these sites (e.g. Renfrew et al.1966, 1968), its proportions within the chipped stone assemblages are unknown. Of great interest is Kaman Kalehöyük, which shows the largest amount of obsidian of all central Anatolian sites. While detailed assessments are not yet available, a preliminary report on the 2002 excavation season shows that obsidian is the dominant raw material in the EBA, MBA and LBA chipped stone assemblages, with ranges from 63% (LBA) to 100% (EBA, whose 2002's sample however contained only 10 lithic specimens). Based on artefact typology, some of this obsidian may be residual from earlier (Neolithic/Chalcolithic) levels and resurfaced because of pit-digging and mudbrick-making activities (Kobayashi 2005; Kobayashi and Mochizuki 2002, 2007). At Çadır Höyük instead, further away, the percentage of obsidian is attested at 23% during the late 4th-early 3rd millennia (Steadman et al.2013:145).

The large chipped stone assemblage of Demircihöyük (c.12,000 specimens) at the north-western fringes of the plateau, contains significant amounts of obsidian (c.15%). However, the author suggests that a large part of the obsidian may be of pre-EBA date based on typological features and the co-occurrence of high percentage of pre-EBA pottery in the same contexts where obsidian was found (Baykal-Seeher 1996a:330). The assemblage of nearby Küllüoba, on the other hand, seems mainly composed of local materials with only a few obsidian blades (Gatos and Efe 2005, Murat Türkteki pers.comm. 14/10/2013), a pattern that is also witnessed at other sites on the northern edges of the plateau such as Eti Yokuşu, Polatlı and Ahlatlıbel.

Given the richer dataset, the Aegean basin yields a more complex picture, in which lithic assemblages at coastal sites in mainland Greece and Crete are dominated by obsidian (>90% of the total), while along the Anatolian coast Iasos, Çukuriçi Höyük, Bakla Tepe and Limantepe are the only ones receiving substantial amounts of obsidian (c.45-70% of the total lithic assemblages, Bergner et al.2009; Kolankaya-Bostancı 2006, 2007; Momigliano 2012:106-112). All other western Anatolian sites display overall much lower proportions of obsidian and a rapid fall-off beyond the central section of the coast. Most sites within the Büyük Menderes basin have been only cursorily published (Karahisar Höyük, Kusura and Kuruçay), thus do not provide reliable datasets. Aphrodisias, the best-studied site in the area (with 1134 analysed chipped stones), however shows very small amounts of obsidian across all EBA levels (c.2-3%, Leurquin 1986). The "EB II" assemblage of Ulucak Höyük, 60km east of Limantepe and 20km inland, shows a proportion of obsidian below 10% (Çilingiroğlu et al. 2004:52; Özlem Çevik pers.comm. 29/10/2013). Similarly, Çeşme-Bağlararası and Emporio, notwithstanding their close proximity to Liman Tepe, both display very low percentages of obsidian (c.1% and 5% respectively, Bialor 1982, Vasıf Şahoğlu pers.comm. 16/07/2013). Neither Poliochni nor Troy, among the most important network hubs in the Aegean basin, seem to have extensively participated in the obsidian exchanges, with 8% and 2.5% of obsidian respectively (Gatsov 1998; Moundrea-Agraphioti 1997). Around the Marmara Sea, the lithic assemblage of the small settlement of Hacılartepe is entirely composed of flint and other local materials, while further north Kanlıgeçit shows small percentages of obsidian (4%, Özdoğan 2012). Lithic assemblages at highland sites like Karataş, Kaklık Mevkii and Seyitömer Höyük are also dominated almost exclusively by chert/flint (Çakalgöz 2000:52; Efe et a.1995:397; Warner 1994:213). Lastly, at Kilisetepe in Rough Cilicia obsidian comprises 9% of the total chipped stone assemblage (out of a small sample, N=32, Reynolds 2007), while the Plain Cilician sites of Gözlükule and Tell Judeideh both show significant proportions of obsidian (18 and 16% respectively, Goldman 1956:255-263, Renfrew et al.1966:60).

Even simply looking at the raw proportions of obsidian versus other chipped stone materials, it seems clear that not all sites received the same amount of obsidian, a pattern that at least partly seems to depend on travel distance[40] from the supposed main sources known sources of Melos and East Göllü Dağ/Nenezi Dağ. Another important element may be the position of individual sites within the exchange networks and their relative importance, something that will be explored further below. Lastly, one could object that lower proportions of obsidian may be expected in areas where high-quality local chert/flint is available; however, across western Anatolia non-obsidian assemblages seem essentially composed by low-quality local materials (Gatsov and Karimali 2007:397).

[40] "Travelled distance" is calculated here as distance from the supposed main sources of obsidian following the major routes sketched in chapter 3, and is distinct from "as-the-crow-flies" distance.

6.1.3 Diversified obsidian products

A further element that may shed light on patterns of obsidian production, circulation and consumption is the form to which it arrived on site: as cortical nodules (which represent the un-modified raw material), as decorticated, preformed cores (representing a further stage of product refinement), and/or as ready-made tools (cf. Carter 1998; Gatsov 1998:137; Perlès 2007:57). This distinction is important because, while basic knapping skills (e.g. to rejuvenate blades, or produce tools from preformed cores) may have been quite widespread among EBA people, working the raw corticated nodules might have been considerably more difficult and required skills that fewer people had (Perlès 1992:129-133). Furthermore, the presence of decorticated cores and the contemporary absence of raw nodules at any one site suggests that pre-formed cores may have been manufactured explicitly for exchange, to provide craftspeople with relatively easy knapping material (Perlès 2007:59). Lastly, the absence of (cortical/decorticated) cores or knapping flakes at a large number of sites indicates that only ready-made tools (particularly blades) reached the settlement; this is confirmed by the presence of obsidian blades at the Dokos shipwreck, and the contemporary absence of cores. While perhaps surprising (thinner tools are more fragile than cores and more prone to break), it suggests that communities at the margins of the obsidian networks would have not been able to knap tools from pre-formed cores (Carter 1998:90).

In the Aegean, with the available evidence raw nodules are only present at western coastal sites and at Bakla Tepe, where small numbers of cortical flakes point to procurement of raw obsidian (fig.6.4, Kolankaya-Bostancı 2006:228). Furthermore, both Bakla Tepe and Liman Tepe have evidence of obsidian knapping within the settlement (Kolankaya-Bostancı 2006, 2008:155).
Decorticated cores are present only along the central-eastern Aegean coast and along the Büyük Menderes valley, while sites further north lack both cortical nuclei and decorticated cores, with the single exception of Poliochni (fig.6.4). A similar pattern already revealed by proportions of obsidian again emerges: sites that also receive large proportions of obsidian (>90%, limited to the western Aegean) are the only ones that receive cortical nodules, while decorticated cores reach settlements that also have 8-70% of obsidian in the total chipped stone assemblages. Below the 8% threshold, only ready-made products occur. In central Anatolia, the situation is again less understood, but a few sites (including Demircihöyük, Kaman Kalehöyük, Alişar Höyük and Çadır Höyük) receive decorticated cores.

6.1.4 The origin of the obsidian found in Anatolia

As mentioned, for obsidian there are a number of provenance analysis techniques whose results are reliable and widely accepted, particularly in identifying well-known and well-characterised sources such as Melos, Yali, Göllü Dağ and Nenezi Dağ (cf. Milić 2014). However, while there are some 18 sites from which data can be drawn, figure 6.2 shows that the sample sizes are in general rather small, ranging from 1 to 105 pieces (average= 24). Furthermore, analysis at some sites (Limantepe, Poliochni, Bakla Tepe, Iasos, Çadır Höyük) relies partially or exclusively on visual discrimination, which is highly dependent on the analyst's skills and thus not entirely reliable. As such, it is not possible to offer a detailed assessment for each site. This nonetheless, there are some clear patterns (fig.6.5): Melian obsidian is distributed within the whole Aegean basin and the Büyük Menderes valley, while Yali obsidian is more common only closer to its source (at Iasos, Çine-Tepecik and Ulucak Höyük, Kolankaya-Bostancı 2011:154; Marina Milić pers.comm. 01/12/2013). On the other hand, EGD/ND obsidian is distributed over a much larger area, spanning from Crete and the Cyclades to eastern Macedonia and Thrace, to the southern Levant and northern Syria (Carter and Milić 2013:541-543; Frahm 2010). Quite surprisingly, some sites in western Anatolia seem to have had more EGD/ND obsidian than sites on the plateau, in terms of raw proportions within the chipped stone assemblage (fig.6.2). Local sources in northern Anatolia may be the origin of Demircihöyük's obsidian, which is at present without known match (Wagner and Weiner 1987). Lastly, while most of the obsidian at Çadır Höyük has its origins in Cappadocia, a single arrowhead was shown to be made of a highly distinctive green obsidian associated with either the Bingöl A, or Nemrut Dağ sources in eastern Anatolia (Steadman et al.2013:141-145).

6.1.5 Patterns of obsidian procurement in EBA Anatolia

The ratios of obsidian within a chipped stone assemblage, the form in which the raw material was procured by the community (as cortical nodules, decorticated and preformed cores or ready-made end-products) and provenance analysis seem to quite clearly define two main distinct but overlapping obsidian exchange networks across the study area (figs.6.6-6.7). Within each of these networks, three areas that define different ways of how obsidian is procured can be distinguished. Slightly modifying the terminology used by Renfrew in his seminal work on obsidian exchange networks (Renfrew et al.1968:328-329), these areas are here termed as "core zone", "supply zone" and "contact zone" and will be discussed in more detail further below.

The first exchange network is centred along the eastern Aegean coast and is dominated by Melian source products (fig.6.6), along with significantly smaller proportions of obsidian from Yali (e.g. at Çine-Tepecik and Ulucak Höyük). While the eastern boundary of this network cannot be defined by scarcity of analyses for the western Anatolian highlands, there exists a rapid drop-off in the amount of obsidian and the absence/scarcity of raw nodules/pre-treated cores at sites 20-30km inland. Interestingly, as also indicated by other analyses in later chapters, the Büyük Menderes river valley seems instead to have facilitated the circulation of obsidian further inland and acted as major natural connection between the coast and the plateau. However, given the location of most of the sites with significant quantities of obsidian and the raw material sources (the islands of Melos and Yali), the network seems mostly to have functioned through maritime contacts. In this context, comparison with datasets from Cretan and mainland Greece sites (Knossos, Myrtos, Manika, Lerna, Lithares and Ayios Stefanos), where obsidian ratios of 91-100% are documented together with the presence of obsidian workshops and cortical cores, allows to formulate a hypothesis regarding possible patterns of procurement within the Aegean basin. At distances up to c.250km from Melos (the "core zone"), chipped stone is almost exclusively composed of obsidian that arrived on site also in un-worked form. At distances between 250 and 400km (the "supply zone"), obsidian is still the dominant raw material, but it arrived on site mostly in the form of pre-treated cores and/or ready-made end-products, specifically blades.[41] Beyond this threshold (the "contact zone"), there is a sudden fall-off in the relative proportion of obsidian in a site’s chipped stone assemblage, with the communities mostly receiving only ready-made blades. This is represented in figure 6.8, a graph that shows good exponential inverse correlation (R^2= 0.83) between the percentage of obsidian at each site and their distance from Melos.[42] The same figure also shows that the presence of cores at each site is largely a function of the distance from Melos. Deviations from this trend can be plausibly explained by the importance of each site within the network, and their proximity to main routes. The hub of Poliochni is a good example: despite its considerable distance from Melos (c.670km), it has higher proportions of obsidian (8%) than surrounding sites and evidence of pre-treated cores.

While at the moment there is no available study on lithic assemblages that covers different EBA phases of a single settlement and it is thus impossible to provide a synthetic diachronic assessment, it is however feasible to compare EBA data with LCh ones at four sites (fig.6.10). In Emporio, LCh levels have much higher percentages of obsidian (19.7%, compared to 4.8% in the EBA) and a larger variety of artefact types, including pre-treated cores that are instead absent in the 3rd millennium (Bialor 1982:708). In LCh Aphrodisias, the percentage of obsidian

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[41] With a longboat, 250km could be travelled in approximately in 6-8 days (or 12-14 in a return trip), and 400km could be crossed in 10-13 days (20-26 days return, cf. section 3.4).

[42] Obsidian ratios for Troy, Liman Tepe, Bakla Tepe, Iasos and Çukuriçi Höyük were modified according to the estimated proportion of Melian obsidian on site (calculated in table in fig.6.2). The best fit with unmodified values is R^2= 0.85.

is also higher at 5.4%, compared to EBA obsidian at 2.5%, and with a higher proportion of pre-treated cores (Leurquin 1986). In Kuruçay, the same trend is also visible, with proportion of obsidian at 16.4% in the LCh levels compared to 11.1% in the EBA phase, and a wider variety of implements (Baykal-Seeher 1996b:126-127, 131). Lastly, Ulucak Höyük's Neolithic obsidian is apparently around 20% of the total assemblage, against EBA ratios of c.10% (Özlem Çevik pers.comm. 29/10/2013). Thus, despite the small number of sites under analysis, it seems possible to suggest that not only the quantity of exchanged obsidian in the eastern Aegean decreases in the EBA, but also that during the EBA obsidian tends more often to be exchanged in ready products (e.g. blades) than in earlier periods, especially outside the central Anatolian coast.

The second main obsidian exchange network is centred on the plateau and is dominated by East Göllü Dağ/Nenezi Dağ obsidian (fig.6.7).[43] Given the scarcity of detailed lithic reports in the area, it can be described in much lesser detail than the Aegean exchange network. In particular, all the excavated EBA sites closest to the supposed main sources (e.g. Konya-Karahöyük, Acemhöyük, Kültepe, Kemerhisar and Kestel/Göltepe) are virtually unknown concerning their chipped stone assemblages. Kaman Kalehöyük is the only central Anatolian site with very high percentages of obsidian, and the closest to sources (c.145km away). All other sites essentially rely on local materials and generally receive only ready-made obsidian tools (if anything at all), though Alişar Höyük, Çadır Höyük and Gözlükule (between 175 and 230km away) receive obsidian also in a pre-treated form i.e. decorticated cores.

While the central Anatolian dataset is overall patchier than the western Anatolian one, it seems nonetheless possible to suggest a general pattern of obsidian procurement for this region as well. The "core zone" (up to 150km away from the sources), where obsidian would have been extensively exchanged and would have been the dominant raw material, is archaeologically unknown. Kaman Kalehöyük is probably located at its margins, given the high proportion of obsidian but the lack of reported un-worked nuclei. At distances between 150-250km away (the "supply zone"), obsidian represents only 15-25% of the total assemblages and is exchanged in pre-treated form (decorticated cores) and ready-made products.[44] Beyond the 250km threshold (the "contact zone"), sites on the plateau display very little or no obsidian, and only ready-made products. Despite the general paucity of obsidian within the central plateau, EGD/ND obsidian

[43] While there is at the moment no evidence for substantial EBA exploitation of local obsidian sources in northern Anatolia (i.e. "Galatia X", Yağlar, Sakaeli-Orta and Kalabak), these are also scantily investigated and may be under-represented in the archaeological assemblages.

[44] Individuals on foot and with substantial load (>15kg) would have travelled 150km in 6-8 days (12-14 days return), and 250km in 10-12 days (20-24 days return trip, cf. section 3.4).

is also found across a very large area that extends until sites in Thrace (Kanlıgeçit) and the western Anatolian coast (Troy, Liman Tepe, Bakla Tepe, Iasos, Ulucak Höyük and Çukuriçi Höyük), all c.700-800km away. In particular, the sites located along the central section of the Anatolian coast receive larger proportions of GND obsidian than most analysed sites in central Anatolia: this is clear in early EBA assemblages of Çukuriçi Höyük and Bakla Tepe (estimated at c.6% and 8% respectively of the whole chipped stone assemblage) and even more so in later EBA assemblage of Liman Tepe (estimated at c.30% of the total lithic dataset, fig.6.2). Notably, Kanlıgeçit in Thrace does not receive obsidian implements (all of central Anatolian origin) before the "Anatolianizing" phase in level KG-2, dated around 2500-2400 cal BC (Özdoğan 2012:232). Rather surprisingly, very small amounts of EGD/ND obsidian (in the range of c.0.2-1% of the total chipped stone assemblage) are found in the central/southern Aegean at EM IIa Knossos and EM IIb Malia, in addition to the Cycladic sites of EC Ib Ano Kouphonisi and Dhaskalio B-C (Carter and Milić 2013:541).

Contrary to what happens in the Aegean (fig.6.8), the percentage of central Anatolian obsidian at individual sites does not seem do have a good inverse correlation with distance from sources (fig.6.9). Even if we only take the central Anatolian sites into consideration, the best fit trend line is R^2= 0.53, and if we include also the western Anatolian sites with EGD/ND obsidian, the best fit trend line further drops to R^2= 0.19. This suggests that, in the central Anatolia network, distance from the source is not the dominant factor defining the amount of obsidian at each site, and that the importance of the settlement and its proximity to main routes may play a more significant role than in the Aegean. In fact, many of the sites on the plateau that do not receive obsidian are small upland settlements and/or in marginal areas (e.g. Eti Yokuşu, Ahlatlıbel, Seyitömer Höyük and Kaklık Mevkii).

Combining the data from the two main networks, it is possible to draw some general conclusions on how obsidian was exchanged in the area during the 3rd millennium: within the core zone, obsidian composed 80-100% of the total lithic assemblage and arrived on site also as cortical (un-worked) nodules, while in the supply zone obsidian composed 30-80% of the total and arrived on site also as decorticated (pre-formed) nuclei. The contact zone is defined by obsidian ratios below 30% (often with a sudden fall-off) and presence only of ready-made products.[45] These different spatial trends most probably represent different ways in which the obsidian was exchanged: in the core zone, raw materials were circulating and were brought to site either directly by the communities living next to the sources, or by the inhabitants going to the obsidian sources and bringing them back to site, with few or no intermediate steps. In the

[45] Given that several sites partake to both networks, they may be in the core/supply region of one network and in the contact zone of the other.

supply zone, obsidian circulated in the form of pre-treated cores and (possibly) ready-made products, worked by communities within the core zone. In the contact zone, several intermediate steps were most probably in place, since obsidian circulated only in the form of ready-made tools.

6.1.5 General trends in obsidian exchange

While intensively exchanged in the Neolithic and Chalcolithic periods, during the Early Bronze Age there is an apparent decrease in the use of obsidian and a concomitant increase in the use of low-quality local sources of flint/chert, at least in western Anatolia where direct comparison can be made (Gatsov and Karimali 2007:397; Kolankaya-Bostancı 2008). Important sites like Poliochni or Troy in the northern Aegean or Küllüoba on the central plateau have very few obsidian implements, and the same can be said for the vast majority of EBA settlements across the Anatolian peninsula. This phenomenon is possibly related with the rise of metal as the primary material for tool production, a hypothesis strengthened by the high standardisation and narrow typological range of the chipped stone assemblages that are largely composed of sickle blade industry (cf. Gatsov and Karimali 2007:397). It is also possible that during the EBA the role of obsidian within the luxury exchange network considerably diminished its importance (in favour to metal) and that in its utilitarian form was acquired and employed only in contexts where its use value was low enough.

A comparison between the two identified exchange networks shows that in the Aegean both the core and the supply zones are wider than in central Anatolia (fig.6.11), and the proportions of Melian obsidian versus local materials within these areas are much higher (fig.6.3). This pattern might be explained by different factors. First, under good weather conditions sea travel is much faster than land travel: a longboat can cover 40-50km a day on average, against 20-24km of a human porter (section 3.4). Thus, in the same amount of time, obsidian in the Aegean can be transported twice as far than in central Anatolia and in fact, if we take into consideration the amount of time to travel, core and supply zones of both networks are very similar (fig.6.11). Second, metal as medium for tool production may have been more prominent in central Anatolia than in the Aegean and/or local chipped stone sources may have been of higher quality in central Anatolia than along the Aegean coast. And third, the political landscape of central Anatolia may have been more difficult to traverse than the one in the Aegean, where island-hopping would have made movement across different communities more fluid. However, the EGD/ND contact zone is much wider than the Melian one (c.1,150km versus 650km radius), and furthermore several sites with good access to Melian obsidian also have some central Anatolian obsidian, particularly settlements along the central Anatolian coast and Knossos on

Crete. This suggests that GND obsidian was probably more valued than Melian obsidian for its larger cores, ease of knapping and translucent purple-grey colour, and exchanged much farther afield. This raises the question about how was obsidian exchanged in Early Bronze Age Anatolia, and who was involved in its production and circulation.

For the Melian obsidian, despite the much smaller dataset at his disposition at the time of publication, Renfrew correctly predicted the exponential fall-off of obsidian percentages from the source and also the anomalies represented by "central places" (network hubs) that have higher ratios than surrounding sites (1975:46-48), which fit very well with the results of the present analysis (fig.6.8). The steep fall-off is probably related to the fact that Melian obsidian is only employed in contexts where is use value is low enough to represent a viable alternative to lesser-quality local materials, thus suggesting a "utilitarian" network. The present analysis can however add important new details to the picture regarding the form in which obsidian was traded, and by consequence to identify the individuals involved in the exchange.

The fact that at increasing distances from the sources Aegean obsidian circulated in different stages of production (un-worked nodules in the core zone, pre-formed cores in the supply zone and as finished products in the contact zone) suggests that the intermediate steps in the exchange do not only represent different people involved, but also further stages of product refinement within obsidian workshops. This means that individuals in the contact zone were not directly linked with those living near the sources, and that they very rarely if ever received un-worked nuclei. Conversely, some people in the core and supply zone were actively acquiring and transforming raw or pre-formed / part-reduced / part-worked product, probably for the explicit purpose of exchanging it with communities farther away. Were they specialised workers? And were they full-time obsidian traders? With regards to the first question, Carter points out that obsidian blades are much more fragile than cores, so transporting blades with the higher risk of breaking them would not make sense if everybody were able to produce them (1998:90). In this regard, however, the Dokos shipwreck among its cargo also contained large quantities of obsidian blades and flakes, but not cores (Carter 1998:52), thus directly proving that ready-made only products did in fact circulate in the mid-3rd millennium Aegean. Carter further adds that pressure-flaking production in EBA western Aegean is clearly restricted to a few sites, and possibly to a few individuals within these sites (1998:111). It seems thus safe to assume the existence of specialised obsidian craftspeople that were operating within a small number of sites, and who were responsible for producing tools that were later exchanged. As to whether these individuals were also personally trading their products, it cannot at the moment be established. However, given that the Melian network functioned mainly through maritime contacts, it was most probably following seasonal cycles, with a peak in spring/summer and a decline or a full stop in autumn/winter. This might indicate that the individuals involved in the obsidian exchange were probably not full-time traders, and raises the possibility that they could have been the same people that produced the tools in the first place.

For the EGD/ND obsidian network, the dataset is overall patchier (with the core zone at present archaeologically unknown), thus the conclusions need to be taken with more caution. While it can be tentatively suggested that circulation mechanisms similar to the Melian network may have been in place within EGD/ND core and supply zones, it seems clear that distance is not the dominant factor to affect the proportion of obsidian at individual sites outside these areas. The absence/scarcity of EGD/ND obsidian at small sites relatively close to the sources, and its concomitant presence in the Aegean at much bigger distances from source and with higher ratios, suggests the presence of more directional exchange patterns (cf. “dendritic interaction”, section 2.3.4). Privileged relations between larger settlements may have existed, with the consequent marginalisation of smaller communities in between them. In this sense, EGD/ND obsidian seems to have been treated as a luxury good rather than an utilitarian one, and its perceived superior quality (with respect to Melian and local northern Anatolian obsidian) may have boosted its spread beyond the area where it would have been economically feasible to employ it. Its circulation may further have been, at least partly, in the hands of specialised figures that acted as intermediaries between the larger centres. It is however clear that, especially at the margins of its distribution (Thrace, Crete and north-eastern Aegean coast), EGD/ND obsidian occurs in very low proportions and is thus likely that it may have arrived as a by-product of other exchanges (e.g. metal, perfumes, jewellery). This hypothesis is supported by the fact that the proportion of EGD/ND obsidian travelling westwards seems to increase in the later EBA: this is very clear not only along the Anatolian coast that has evidence of central Anatolian obsidian since the LCh, but also in Thrace, Cyclades and Crete where it appears around 2500-2200 BC, in concomitance with the strengthening of long-distance exchange networks between plateau and western Anatolia in this period.

An important note is that the pattern of obsidian ratios across the Aegean shows the importance of the Cyclades as favourite route connecting the two sides of the Aegean (cf. section 3.3). In Anatolia, the area that receives the highest quantities of Melian obsidian is right at the eastern end of the "Cycladic corridor", while places like Emporio and Çeşme-Bağlararası, despite being closest to Melos in a straight line, receive very little obsidian. This confirms Broodbank's model of EBA Aegean seafaring that favoured island-hopping and avoided -unless necessary- the crossing of "sea-deserts", i.e. large stretches of open sea (2000:287-278) like the one between Chios and the northern Cyclades. Also, the Büyük Menderes valley seems to play an essential role in favouring and funnelling the interaction between the western Anatolian coast and the central plateau: all the sites with the highest proportions of central Anatolian obsidian are along its basin and at the western end, while the inland site of Aphrodisias shows presence of Melian obsidian.

6.2 Metal in EBA Anatolia

Metallurgy is certainly one of the more thoroughly investigated topics in EBA Anatolian archaeology, with a vast range of publications in international journals, a conspicuous number of synthetic overviews (Bilgi 2004; De Jesus 1980; Lehner and Yener 2014; Pernicka 2014; Yakar 1984, 1985; Yener 2000) and edited works (Yalçın 2000a, 2002, 2005, 2008a, 2011, 2013; Yalçın et al. 2008). Metal objects are also among the earliest to have received analytical treatment, with studies on metal chemical composition dating to the late 1870s (a few objects from Troy, Schliemann 1881:532-533), i.e. as early as the beginning of prehistoric Anatolian archaeology itself. The first overarching work was carried out in the 1960s,[46] which included several hundred objects from EBA/MBA Anatolia (Esin 1969) and still represents an important -albeit flawed- reference dataset. In the 1980s and 1990s, several teams conducted parallel programmes for chemical composition and lead isotope analysis coupled with extensive archaeo-metallurgical surveys across Anatolia, in search for archaeological evidence of ancient mining (Begemann et al.1992, 1995, 2003; Pernicka et al. 1984, 1990; Seeliger et al.1985; Stos-Gale 1992; Gale et al.1984, 1985; Wagner and Öztunalı 2000; Wagner et al.1984, 1986; Yener and Özbal 1987). Concomitantly, several prehistoric mining/smelting sites were being excavated, including Kestel/Göltepe (Yener 2000) and Derekutuğun (Yalçın and Maass 2013), together with intra-site metallurgical workshops, e.g. at Limantepe and Bakla Tepe (Keskin 2009) and Çukuriçi Höyük (Horejs et al.2010b; Horejs and Mehofer 2015; Mehofer 2014). A number of studies have also been conducted on technological know-how (Hauptmann et al.2002; Müller-Karpe 1994; Yalçın 2008b), suggesting that there might have been a substantial directional flow of metallurgical know-how from metal-rich regions like the Antitaurus Mountains to metal-deficient regions like Upper and Lower Mesopotamia (Bachhuber 2008:67; Lehner and Yener 2014; Yener 2000:6).

The results of this substantial corpus of research have shown that the Anatolian uplands are very rich in polymetallic ores including gold, silver, copper and lead, and that these deposits had a significant impact on EBA metallurgy and metal exchange within Anatolia and with neighbouring regions. Further, by the mid-4th millennium there is substantial evidence of organised extraction, production and distribution of semi-finished and ready metal products, and a significant phenomenon of experimentation with new copper alloys (such as As-Cu, Pb-Cu,

[46] The Stuttgart programme (Studien zu den Anfängen der Metallurgie).

Ag-Cu), a process that intensified and became more structured in the 3rd millennium. Thus, in the EBA as in earlier periods, metallurgical know-how was among the most advanced in the Near East, Aegean and Balkan worlds and certainly Anatolia (in particular the Taurus/Antitaurus Mountains) may be considered one of the most important metallurgical cores of the Old World. However, despite the wealth of research and despite the undoubtable importance of metal for the development of interregional exchange networks, there has been substantially less academic effort to integrate data coming from different regions within Anatolia and contextualising the area with the wider eastern Mediterranean and Near East. Further, very little has been written about the organisation of metallurgical production, with the notable exception of Lehner and Yener 2014.

The following analysis thus aims at reconstructing the metal exchange networks from mines to archaeological depositional contexts, looking in particular at how manufacture and trade were organised. While the focus of the analysis is EBA Anatolia, limited comparison with earlier/later periods and neighbouring areas will be made when necessary. A detailed reassessment of the location of known Anatolian metal ores will be presented (section 6.2.1), followed by an analysis of the archaeological evidence for mining, smelting and secondary production (sections 6.2.2 and 6.2.3). The second part will employ published data on provenance analysis and chemical composition to sketch broad patterns of metal circulation (sections 6.2.4 and 6.2.5), while section 6.2.6 will summarise the results and briefly contextualise them within the broader eastern Mediterranean and Near East.

6.2.1 Anatolian metal ores

Since the early 1960s, Anatolian metal ores have been subjected to detailed investigation by the General Directorate of Metal and Mineral Research in Turkey (MTA) that was specifically aiming for exploitable and economically profitable deposits. While this drive has resulted in a large quantity of data on ancient mines (as a by-product and with the collaboration of archaeo-metallurgists), there are reasons to believe that the picture derived from MTA and archaeological research is not wholly representative of the metal ores that could have been exploited in prehistory. For instance, MTA prospectors have a skewed perspective towards deposits that can be exploited with modern technology and in the context of global market economy. Also, the productivity of a mine ("grade" or “tenor”), calculated on the ratio of metal versus mineral matrix and expressed in gram/tonne, may have been different today from the past. Since the concentration of minerals in the gangue (rock matrix) is not constant but varies within the same deposit, EBA prospectors would have targeted richer veins and not pursued the exploitation of lesser-grade occurrences. It is also likely that metallurgists might have had different perception of what was economically viable then and now. Furthermore, MTA prospectors may have overlooked mines that were exhausted in antiquity or too small for economic profit today, but that could have been used on a local or regional level during the EBA. Similarly, researchers may have missed signs of ancient mining because the latter may have been destroyed by large-scale recent activities. Additionally, there are deposits that would most likely not have been detected or not exploitable with EBA technology. And lastly, the relative importance and economic profitability of a metal deposit has to be judged also based on its proximity to the main routes: there are deposits that yield excellent copper, but are so inaccessible that would have been difficult to exploit in the EBA on scale beyond that of local communities.

With these caveats in mind, it still seems possible to employ modern data as an imperfect proxy for how the "metallurgical landscape" may have looked like to EBA prospectors. Figures 6.12-6.15 show the location of known copper, gold, silver and tin deposits in western and central Anatolia; these composite maps have been produced from a number of sources, the most important of which are the MTA reports.[47] Other works focusing on local sources have also been included (Bilgi 2004; De Jesus 1980; Legeranlı 2008; Gale et al.1985; Yalçın and Yalçın 2009; Webb et al.2006).

6.2.1.1 Copper deposits

With regard to copper, figure 6.12 clearly indicates that it is rather common across Anatolia, with the notable exception of the central plateau (composed mostly of sedimentary rocks) and south-western Anatolia. Significant, if smaller, copper deposits are also known from eastern Thrace and the Aegean at Thasos, Kythnos, Seriphos, Lavrion and possibly Kea (Gale and Stos-Gale 1989; Stos-Gale 1998; Stos-Gale et al.1988; Stos-Gale and McDonald 1991). Cyprus is also a region with major copper sources, whose exploitation clearly started in the 3rd millennium but seems to have reached its apogee only in the 2nd millennium (Webb et al.2006:270). The majority of these deposits are composed of sulphidic ores which necessitate a more complex smelting technology available only from mid-4th millennium onwards, involving roasting, smelting, slag-crushing and re-melting. There are however also numerous occurrences of oxidic ores (e.g. azurite, malachite and cuprite) that could have been used by MCh metallurgists for copper smelting (Wagner and Öztunalı 2000). A very important point to make for later

[47] These reports were available online until at least 20/03/2010, but no longer available at present (http://www.mta.gov.tr/v2.0/eng/maps.php?id=mineral-maps-provinces). Less detailed maps from MTA are now presented on the website, and have been used only to update the gold and silver deposits (http://www.mta.gov.tr/v2.0/indexb.php?id=maden_yataklari, last accessed 22/12/2013).

discussion on copper alloys is the complex polymetallic nature of most metal occurrences in Anatolia: lead, arsenic, antimony, tin, zinc and iron are elements that can be easily found associated with copper. Particularly for arsenic, its widespread co-presence in copper minerals is possibly one of the main reasons why this metal constantly shows up in different quantities in most EBA Anatolian metals (section 6.2.5). In some cases, deposits that are now economically profitable for silver or gold may have been exploited in the past also for the co-occurring smaller copper mineralisations (Legeranlı 2008:358; Wagner and Öztunalı 2000). Modern estimates on potential Turkish metal copper reserves mention a staggering 1,700,000 tonnes, 98% of which are concentrated along the central and eastern Black Sea coast and south-eastern Anatolia (fig.6.16, MTA 2001a). However, even the remaining 34,000 tonnes (half of which concentrated in the Troad) would arguably have been more than sufficient to provide for all pre-20th century copper production in west and central Anatolia, and even very small deposits characterised by high-grade ores would have been sufficient to cover the needs of local communities for several generations.

6.2.1.2 Silver/lead deposits

Contrary to copper, silver deposits are much scarcer in the study area, and are essentially concentrated in north-western Anatolia, the eastern Taurus Mountains, the eastern Black Sea coast and the area around the Keban/Ergani Maden in south-eastern Anatolia (fig.6.13). Deposits with a high silver grade (100-500 gr/ton, fig.6.16) that could have potentially attracted early prospectors are found in western Anatolia at Altıntepe, Arapdağı and Gümüldür (İzmir), Gümüşköy (Kütahya), in central Anatolia in Bolkardağ (Niğde Massif) and Aktepe (Sivas) and on the eastern Black Sea coast at Cerattepe and Murgul (Artvin). Balya (Balıkesir), despite having been abandoned in the early 20th century, was also a very important deposit with an estimated 1000t of silver and 3t of gold extracted between 1880 and 1935 (Wagner and Öztunalı 2000:35). With the exclusion of Cerattepe, Gümüşköy and Balya that cumulatively yield c.95% of all silver reserves in Turkey (an estimated 6,500 tonnes, MTA 2001b), all other deposits are relatively small, with estimated reserves between 5-130 tonnes (fig.6.16). Lastly, important prehistoric silver resources outside Anatolia are represented by Lavrion in Attica and Mt. Pangaion in Macedonia.

6.2.1.3 Gold deposits

Gold deposits are characterised by much lower grade than copper and silver ones, i.e. the quantity of metal that can be extracted from the gangue is on average much more limited. To give an example, as much as 20-50kg of copper can potentially be extracted from a tonne of gangue in a high-tenor mine, against an average of c.100-300gr of silver and 5-15gr of gold (fig.6.16). So, more than with silver and copper, the possible prehistoric exploitation of gold ores has to be discussed keeping in mind the potential of such deposits to be recognised by EBA metal prospectors, a factor that relates with their metallogenesis. In Anatolia, gold deposits are essentially of five types (fig.6.14): hydrothermal, porphyry-type, skarn-type, volcanic-sulphidic and placers (Bayburtoğlu and Yıldırım 2008). With the EBA metallurgical technology, only hydrothermal (divided in epi- and meso-thermal) and placer deposits (the latter being secondary, i.e. alluvial deposits in riverine and coastal sands) would have been exploited. Because of their visibility and the ease to collect gold (by panning river sediments or mining geological alluvial strata), placers are probably the earliest deposits to be exploited, given the fact that gold is ready to be worked without any further processing (though often found in the form of electrum, a natural silver-gold alloy).

Epithermal deposits are essentially found in western Anatolia at Ovacık (Balıkesir), Küçükdere (Balıkesir), Arapdağı (İzmir), Gümüşköy (Kütahya), Kepsüt and Söğüt (Bilecik), while mesothermal deposits are found in north-west Anatolia at Kartaldağ, Şahinli-Lapseki and Akbaba (Çanakkale), and in the eastern Black Sea region at Giresun and Gümüşhane (MTA 2010). The region around modern İzmir is also replete with mesothermal deposits, especially on both sides of the Küçük Menderes river and in the Bozdağ Mountains (at Küre, Geyikdağ, Boğazyayla, Yediler Tepe, Tire and Zeytinlik/İncilipınar) and in Seferihisar (Efemçukuru). In particular, at Tire, Efemçukuru and Zeytinlik/İncilipınar very high gold contents (10-50gr/ton) have been reported in some of the assaying samples (Frontline Gold 2012; Legeranlı 2008). Large numbers of mesothermal deposits are known within the Rodopi Mountains in south-eastern Bulgaria, including those tapped by the LBA mine of Adatepe (Marchev et al.2004; Melfos et al. 2003). The best known placer in Anatolia is at Sart, located in the immediate vicinity of ancient Sardis: its exploitation was instrumental to the rise of the Lydian kingdom in the 1st millennium (Meeks 2000), and was exploited in prehistoric times as well (see section 6.2.4). Others include Akıllıçay near Antakya, Ulukışla in the Bolkardağ Mountains and İğneada in eastern Thrace (Bayburtoğlu and Yıldırım 2008:8). In Macedonia, two placers are known at Mt. Pangaion (Stos-Gale 1992:156) and in the Xanthi region (Vavelidis et al.1990).

6.2.1.4 Tin deposits

Lastly, tin mineralisations of stannite and cassiterite, both in primary (epithermal) and secondary (placer) deposits, have long been recognised in Anatolia in a number of different places (fig.6.15). At the Sart gold placer, some of the panned examples proved to be cassiterite (Kaptan 1995:199), and 8% of analysed gold globules found in the Iron Age gold refinery at Sardis yielded tin contents between 1.4-19.3 wt% (Meeks 2000). In eastern Thrace, at Kofçaz-

Burgaz (Kırklareli) cassiterite crystals of fairly large size (1cm^3) were found in pegmatite veins, while at Çilingoz (Tekirdağ) and Şile (İstanbul) cassiterite was found in river and beach placers while panning for gold (Kaptan 1995:199). Stannite was found at Keles (Bursa), though in concentrations that would have probably made prehistoric exploitation unlikely, and the place is otherwise known to be a copper mine with possible prehistoric exploitation (Wagner and Öztunalı 2000:37). In the Taurus Mountains, stannite was found in Bolkardağ, while cassiterite was found both in primary deposits at Kestel and in three nearby placers at Celaller, Kılavuz and Eynelli (Yener and Özbal 1987). More recently, deposits of a new tin mineral (yazganite) have been reported at Hisarcık near Kayseri (Yalçın and Özbal 2009; Yener et al.2015). While there is good evidence for the occurrence of tin minerals in Anatolia, there is disagreement whether there was actual exploitation during the EBA, a discussion that however sparkled in the 1990s essentially around the findings of Kestel mine. While this topic will be discussed later in more detail, what seems important to note is that eastern Thrace and the Marmara region clearly have no tin bronzes until the late EBA or even later (see below), so these deposits were probably not used in the 3rd millennium. The widespread occurrence of low-grade tin deposits, often associated with other minerals like copper may explain to some extent the low (<2 wt%) concentrations of tin in many analysed copper artefacts.

6.2.2 Mining and primary smelting sites

The MTA reports and several archaeo-metallurgical surveys conducted by the Heidelberg team (Pernicka et al.1984; Seeliger et al.1985; Wagner et al.1984, 1986) have found evidence for over 300 mines with evidence of pre-industrial exploitation. Of these, c.60 were catalogued as having been potentially used in prehistoric times based on the typology of the shafts, the presence of stone tools, dating material and/or radiocarbon dates on wooden beams used for support of the tunnels' roofs (figs.6.17-6.18). Most of these are also associated with substantial amounts of slag, hinting at ore processing in the immediate vicinity of the mine itself, and in a few cases these workshops have been archaeologically investigated, revealing prehistoric levels. While it would be impossible to treat them all in detail, the most significant ones will be briefly assessed. With the available data, the earliest evidence of underground mining activities (on oxidic copper deposits) comes from the central and eastern Black Sea region at the sites of Kozlu (Tokat) and Murgul (Artvin) where, together with ample evidence of prehistoric exploitation, radiocarbon samples provided dates around 4700-4500 cal BC and 3600-3400 cal BC respectively (Wagner and Öztunalı 2000:46-50). The dates of Kozlu are roughly contemporary with the earliest occurrence of smelted copper at Yumuktepe in Cilicia, c. 5000-4800 BC (Yalçın 2000b). Çamlıbel Tarlası (Çorum) is a site dated by several radiocarbon dates to 3600-3470 cal BC that provides so far the earliest direct evidence of extraction and refining (through roasting) of sulphidic copper ores (Schoop 2011a). In the same area, the Derekutuğun mine, object of a recent programme of archaeological survey and excavation, revealed a large complex of narrow shafts used to extract oxidic ores as well as native copper. The adits show fairly sophisticated assaying and prospecting techniques, with some of the tunnels only employed for explorative tests while other only used for water drainage. The analysis of a large quantity of archaeological material found stratified inside the shafts, coupled with an extensive radiocarbon-dating programme, clearly indicates its use at least from c.2900 to 2500 cal BC, a time when production possibly moved to the nearby mining complexes of Hıdırbağ and Karanlık Dere, which both yielded radiocarbon dates between c.2300-1900 cal BC. The associated settlement (500m away) has been so far investigated only with geophysics and survey: stone walls and terraces were visible from the electric resistivity maps, while crucible fragments, slag and stone tools were recovered from illegal pits (Yalçın and Maass 2013).

With regards to silver exploitation, the small site of Fatmalı-Kalecik (Elaziğ) yielded the earliest evidence of silver cupellation in a level dated to the early 4th millennium: analysis of the silver slag (litharge) revealed an advanced stage of cupellation technology, suggesting that the beginning of silver smelting may have occurred at an even earlier date (Hess et al.1998). The sites of Arslantepe and Habuba Kabira, on the Upper and Middle Euphrates respectively, also yielded litharge fragments dated to the late 4th millennium (Hess et al.1998:57). In western Anatolia, the most important prehistoric silver mine is that of Gümüşköy (Kütahya), which provides still today c.60% of the total Turkish silver. It is very easily accessible, and yields argentiferous galena, native silver, sulphidic and oxidic copper ores. Prehistoric exploitation is ascertained by a large number of small irregular adits, stone tools and prehistoric pottery associated with the ore dumps. Two radiocarbon samples directly date the frequentation of the mine to the mid/late EBA: one comes from a shaft 46m below ground and provided a date of 2200-2000 cal BC, while a piece of mining timber from an unknown location within the mine has provided a date of 2480-2250 cal BC (Wagner and Öztunalı 2000:38). Small prehistoric shafts were found also at Balya Maden (Balıkesir), one of the main silver deposits in Turkey until the early 20th century that produced smaller quantities of gold as well; copper-oxide mineralisations are still visible on the surface and might have been targeted in prehistory (Wagner and Öztunalı 2000:34-35).

For what concerns the exploitation of gold during the EBA, evidence is at the moment much sparser than for silver and copper: Balya Maden in Balıkesir might have been exploited also for its gold deposits, though no direct confirmation can be produced at present. The other possible mine is located at Kartalkaya (Classical Astyra) near the site of Troy, where old workings tap into a mesothermal deposit of native gold; while no direct proof of prehistoric exploitation has been brought forward, gold was certainly extracted in Classical times (Pernicka et al.2003).

Kestel mine, mostly known for its tin-bearing ores, is a very likely candidate for the early extraction of gold (see below). Placer deposits may have well been the earliest and easiest gold sources during the EBA, though no direct proof can be produced since their exploitation would have mostly involved wooden structures and small dams that would have left barely any trace in today's landscape. However, analysis on trace elements of several Lower Mesopotamian and Egyptian gold artefacts confirms the exploitation of the placer near ancient Sardis already around 2600 BC (Young 1972). Other major gold placers are found at Akıllıçay (Antakya), Ulukışla (Bolkardağ) and İğneada (eastern Thrace, Bayburtoğlu and Yıldırım 2008). Further north, the gold mine of Adatepe (Rhodopi Mountains, south-eastern Bulgaria) has shown evidence for LBA and Iron Age exploitation (Marchev et al.2004; Popov and Jockenhövel 2011; Popov et al.2011).

Turning our attention to the exploitation of tin minerals, the complex of Kestel/Göltepe in the eastern Taurus Mountains represents the best context for the analysis of mining operations during the 3rd millennium. It is located on deposits composed of gold and tin minerals embedded in iron ore, while in the immediate vicinity of the mine secondary (alluvial) deposits of cassiterite were found in the Kuruçay creek, and a gold prospect was detected less than a km away (Earl and Özbal 1996; Willies 1992, 1995). At Kestel itself, over 1.5km of tunnels (an estimated 4,500m^3 of excavated rock) were exposed in association with significant amounts of stone tools and EBA pottery (Yener 2000:71-98). The tunnels revealed an advanced set of skills for the exploration of richer veins and their maintenance, with a range of prospect drives, raises, winzes and water-drainage adits (Earl and Özbal 1996:295). Immediately outside the mine, several stone surfaces had been used for ore-crushing, as witnessed by the several hundred small hollows carved on their surface, and a large number of work stations were further identified around the mine entrance for a total area of c.50ha (Yener 2000:86). Several radiocarbon samples from archaeological deposits inside the tunnels cluster between 2800 and 2200 cal BC, although one sample is significantly earlier and suggests that the beginning of mining activity may have started around 3700-3300 cal BC, confirmed by several LCh sherds both inside and outside the mine (Yener 2000:92-96, table 3). Analysis of ore samples collected from the tunnels' walls yielded overall low amounts of tin (mostly around or below 0.001 wt%), though some samples from recognisable tin-bearing veins have yielded between 0.1-1.5 wt% tin (Yener and Goodway 1992:78; Earl and Özbal 1996:294). This suggests that while most of the tin-rich veins had been exhausted in prehistory, pristine tin-bearing veins at Kestel would have been relatively rich and recognisable by EBA metal prospectors.

The associated settlement of Göltepe (2km away) consists of a higher part surrounded by a circuit wall (c.5ha) and a lower part extending for another 4-5ha: even considering the low density of buildings, the area occupied indicates the presence of at least several hundred individuals. Most of the investigated structures were described as semi-subterranean pit-houses with wattle-and-daub superstructure and plastered walls, though in the later phase (“EB III”), some structures were built over ground and a public building was reported but not described in detail. The internal assemblages of these buildings include large storage vessels, sacks with crushed ore, ore lumps, crushed slag fragments, large quantities of crucible fragments (over a tonne!), 5000 ore-/slag-crushing stone tools and rod-ingot moulds (Yener 2000:98-107). Its location on the exposed flanks of a mountain-top at 1770m a.s.l. suggests that most of the settlement may have been characterised by seasonal occupation (Lehner and Yener 2014:5). The distance from the mine, the locational choice on a mountain top and the presence of a substantial perimeter wall further hint at issues of defensibility. A set of 18 radiocarbon samples clusters between 2870 and 2050 cal BC, thus confirming the dates obtained from the mine. However, two samples are again much earlier than the others and seem to place the earliest frequentation of Göltepe between 4300-3700 cal BC (Yener and Vandiver 1993:table 1; Yener et al.2003).

The criticisms surrounding Kestel/Göltepe were mainly focused on the feasibility of tin exploitation at the site, based on the first results published by the excavation team (Hall and Steadman 1991; Muhly et al.1991; Muhly 1993). This debate has prompted an analytical effort conducted over the following 20 years and by different researchers to ascertain whether tin was effectively one of the metals targeted by EBA miners at the site. These efforts, in conjunction with the recent discovery of another EBA and MBA tin mine in the Kayseri region (Hisarcık, Yalçın and Özbal 2009; Yener et al.2015) seems to have brought this debate to rest, and former critics seem to agree that local production of tin did in fact occur in Anatolia during the EBA (Lehner et al.2015:205-209; cf. also Stöllner et al.2011:231-232 for another recent endorsement). With regard to the large quantities of crushed and powdered ore found within the Göltepe settlement context, analyses have determined that some of the samples contained substantial amounts of tin minerals, between 0.28-3.65 wt% tin, thus suggesting a substantial process of mechanical enrichment of the ore through vanning (Adriaens et al.1999a:83; Earl and Özbal 1996:296; Lehner and Yener 2014:14). Similar results were obtained from the analysis of slag on crucibles: 4 out of 28 crucibles yielded tin contents between 1.1-3.6 wt%, while the others contained only small traces of tin, 0.001 wt% on average (Earl and Özbal 1996:298). Further analysis indicates that some vitrified crucible concretions contained as much as 30-90 wt% tin oxide (Adriaens et al.1996, 1999a, 1999b). The results of these analyses thus confirm that tin was one of the intended targets of the mining operations, a hypothesis further strengthened by the percentage of high-tin bronze artefacts found on the settlement (6 out of 8 had tin ratios mostly around 11-12 wt%, Yener et al.2003), higher than any other contemporary settlement contexts in Anatolia (see section 6.2.5). On the other hand, the very low ratios of tin found in many crucibles and powdered ore indicate that other metals were extracted, likely gold (Earl and Özbal 1996:295; Muhly et al.1991; Yener 2000:73). This hypothesis is further strengthened by one early (3600-3300 cal BC) radiocarbon date from the mine and the presence of LCh pottery, that would otherwise place the extraction of tin several hundred years earlier than the earliest occurrence of tin bronzes in the area.

Based on extensive archaeo-metallurgical research that also included experimental panning, enriching and smelting of tin ores, the process of tin refinement at Kestel has been characterised as a labour-intensive cottage industry consisting of several steps. After grinding the iron-rich cassiterite into powder consistency, the ore was hand-sorted, transported to Göltepe where it was subsequently smelted in crucibles or bowl furnaces with blow-pipes and tuyères. The resulting product, a mix of small tin prills embedded in slag, was further grounded, enriched by washing and re-smelted to reach the final product, which was then poured into rod-ingot moulds (Lehner et al.2009:166).

A second important piece of evidence of EBA tin extraction is represented by the Hisarcık mine near Kayseri, where preliminary explorations revealed six small irregular adits carved with stone tools and a water-drainage tunnel. A prehistoric settlement (dateable to 3rd and 2nd millennia by pottery and obsidian finds) was also found just uphill from the mine (Yener et al.2015). The target of the mining complex was most probably tin, found embedded in hematite-rich veins in form of cassiterite crystals up to 100μ. Two out of four analysed samples contained 0.12-0.21wt% tin, and experimental crushing and vanning of the Hisarcık ore produced an enriched samples with up to 20 wt% tin (Yalçın and Özbal 2009; Yener 2009:146).

6.2.3 EBA intra-settlement metal workshops

The earliest evidence of secondary metallurgical production activities (i.e. intra-site workshops) in eastern Anatolia occurs already in the mid-5th millennium BC (at Değirmentepe) and early 4th millennium (at Fatma-Kalecik), followed by Norşuntepe and Arslantepe during the late 4th millennium (Hauptmann et al.2002; Hess et al.1998; Pernicka et al.2002). Çamlibel Tarlası (radiocarbon-dated to c.3700-3600 cal BC) represents instead the earliest evidence for central Anatolia (Schoop 2011b). In the west, the LCh phases of metallurgical activity in Limantepe, Bakla Tepe and Çukuriçi Höyük (c.3300-3000 cal BC) represent at the moment some of the earliest evidence of secondary metal production in the Aegean basin (Keskin 2009; Mehofer 2014). These are broadly contemporary with Kephala Petras and Phaistos on Crete (Papadatos and Tomkins 2013:367; Todaro and Di Tonto 2008:183). It is only during the EBA that metallurgical workshops become fairly common in the study area; even then, they come mainly from the area around the Aegean coast (figs.6.19-6.20) at Poliochni, Thermi, Troy, Çukuriçi

Höyük, Limantepe and Bakla Tepe (Horejs et al.2010; Horejs and Mehofer 2015; Kouka 2002; Keskin 2009). Another important addition is represented by Keçiçayırı, a fortified hill-top settlement in the Afyon region (Efe et al.2011). This by no means implies the absence of similar contexts elsewhere in Anatolia (e.g. at large centres like Alişar Höyük, Acemhöyük, Karahöyük and Kültepe), but simply represents the current status of archaeological research. This is confirmed by the recent findings of several pieces of iron slag in Kaman Kalehöyük level IVa and Alacahöyük level 4 (both dated to the latest EBA), unfortunately from poorly-described contexts (Akanuma 2008; Çınaroğlu and Çelik 2010:339). Most of these sites are close (15-20km) to known polymetallic deposits and potential prehistoric mines (fig.6.19).

These sites are characterised by the presence of intra-site metallurgical workshops that seem to occupy only a portion of the whole settlement; when excavations provide a diachronic understanding of the occupation, metalworking occurs throughout the different phases. In a few cases, this continuity can be observed even within the same building in different levels spanning several hundred years, for example in Poliochni's megara 832 and 605, Thermi's area Epsilon and Limantepe's houses 2 and 3 (Keskin 2009:99-112; Kouka 2002:125, 234). This evidence strongly suggests that metallurgical production was spatially delimited and that, at least in certain cases, it may have been the prerogative of different small social groups living together (families?). Some of the workshops in Poliochni, Thermi and Limantepe further suggest that technological knowledge may have been transmitted from one generation to the other, hinting at the inheritance of metallurgical craft. The workshops themselves generally occupy several contiguous rooms and are in most cases identified by the presence of crucibles, metal furnaces, tuyères, stone crushing devices, stone/clay moulds for objects and rod-ingots co-occurring in the same context (fig.6.20). In several cases, slag are also present, often in substantial quantities: in the general absence of chemical composition analysis, it is not possible to establish with certainty the type of activity that produced them,. However, their location within the settlement suggest that they are not a by-product of primary smelting but rather the result of metal refinement (from re-melted objects) and/or the result of alloying copper with arsenic- or lead-rich minerals. The only detailed chemical composition analysis on slag carried so far (at Çukuriçi Höyük) seems to confirm this hypothesis, and suggests a process of “crucible smelting” of small quantities of copper with iron arsenides (Horejs and Mehofer 2015:172). However, despite the fact that several occurrences of metal slag are reported at numerous Aegean sites (fig.6.20, cf. also various contributions in Day and Doonan 2007), there is a stark difference in the magnitude of slag debris inside settlements and near the extraction sites (compare e.g. with data from Wagner and Öztunalı 2000, where hundreds or thousands of tonnes are often reported). This suggests that the intra-site smelting activities were in all likelihood functionally different, probably linked with alloying practices rather than metal refinement. Indeed, the large number of moulds for objects in these lowland workshops indicates that probably most of the activities involved the manufacture of finished products; the retrieval of ingot moulds shows that metal was also re-melted into easily-transportable shapes for further redistribution.

Interestingly, many of these sites further yielded stone weights in considerable numbers, sometimes directly associated with the workshop areas (e.g. Poliochni's megara 832 and 605, Thermi area Epsilon, see section 5.1.3). As discussed below in more detail, these finds indicate that metal (in particular gold and silver) might have been exchanged by metallurgists within a fairly standardised system of values. Where more detailed information on the archaeological assemblages is available, e.g. in Çukuriçi Höyük, Poliochni and Limantepe, it is clear that the workshop areas were part of a larger domestic complex, given the amount of finds unrelated with metallurgical activity found in neighbouring rooms, such as tools for textile production, carpentry and leather processing, and installations like baking ovens, hearths and cooking pots (Horejs and Mehofer 2015; Keskin 2009:99-112; Kouka 2002:62-63, 76, 93-94, 116-118).

The scarcity of contextual analysis considerably hinders the ability to clearly define issues of scale in production. Despite the fact that most of the finds come from poorly stratified contexts, the number of metallurgical tools found at several sites may hint that metal manufacturing may have been a very important activity in their overall economy (fig.6.20). Another indirect proxy for measuring the scale of production can be provided, with caution, by the raw number of metal implements found within settlements hosting metallurgical activities. The settlement contexts of Thermi (90 pieces), Poliochni (c.370 items), Limantepe (c.100), Troy (an educated guess of several hundred items excluding the "Trojan treasures"), Çukuriçi Höyük (173 pieces) and Bakla Tepe (c.100 objects) seem to have on average much higher quantities of metal than contemporary sites in the Aegean and Anatolia (cf. Nakou 1997:fig.1, calculating c.350 metal objects retrieved from all the excavated EBA sites in the Cyclades and mainland Greece!). Additionally, all coastal sites with metal workshops have extensive evidence for long-distance interactions with both western Aegean and inland Anatolia, and the trade of metal might certainly have been one of the main reasons behind it. This is particularly evident at Poliochni and Thermi, where areas with metallurgical activities also yielded higher proportions of luxury items, imported vessels and metal objects (Kouka 2002:125, 234).

To summarise, the contexts analysed so far are embedded with the residential fabric of the settlement, are not in direct spatial proximity with public buildings (e.g. "palaces"), normally extend only over a few rooms, have evidence of concomitant domestic activities within the larger complex and seem confined within a small social group (probably an extended family). On the other hand, they are often among the wealthiest domestic contexts found within the site and their settlements tend to have higher quantities of metal implements than other contemporary counterparts. With some degree of caution, they can be thus characterised as small-scale enterprises carried out by full-time specialists that were largely independent from elite control.

In addition to these well-documented workshops, there is indirect evidence that highly specialised craftspeople may have operated under more direct elite control. For instance, the manufacture of large numbers of gold, silver and bronze objects found at several sites across Anatolia such as the hoards from Troy, Poliochni, Eskiyapar and Mahmatlar, and the Alacahöyük and Horoztepe "Royal" graves (Arık 1937; Bernabo-Brea 1976:284-291; Koşay and Akok 1950; ÖzgüçT and Akok 1958; Özgüç T and Temizer 1993; Sazcı 2006) reveals the use of complex techniques such as filigree, lost wax and inlay. Each of these assemblages contained several kilograms of silver and gold. At Troy, where measurements are provided systematically, the aggregated weight of all the published items reaches over 3.5kg of gold and 9kg of silver; some of the gold vessels weigh up to 600gr each and some of the silver pieces up to 2kg (Sazcı 2006:369-418). The sophisticated skill set necessary in their production, the employment of precious metals in large quantities and their finding context clearly point to a manufacture specifically aimed for the consumption of elite groups in large centres. Therefore, even in absence of direct archaeological proof the existence of highly specialised metallurgical workshops under direct institutional control cannot be doubted. At the other end of the spectrum, the sporadic retrieval of simple moulds and the occasional crucible at a large number of other sites across west and central Anatolia suggests a more dispersed pattern of production in which a few individuals within smaller settlements might have had basic metallurgical knowledge to manufacture simple implements, possibly through the re-melting of scrap metal or semi-finished products.

Before concluding this section, it seems worthwhile discussing a particular category of artefacts often found in association with primary and secondary metal production sites. From the early 3rd millennium onwards, and in contemporary with the start of more intensified and articulated metal manufacture, both metal ingots and the moulds used for their production start to appear at several sites. This indicates that metal circulated also in form of semi-finished objects that would have been easier to create (with open moulds) and to transport (with regular shapes that could be easily stacked and/or bundled together), likely connected to the use of new transport carriers such as donkeys, carts and longboats (cf. Bevan 2010). The most common type of ingot moulds often presents casts for several parallel rod-shaped ingots, though oblong bun-ingot moulds are also common (fig.6.21); in most cases the casts are relatively small (6-16cm in length), with an estimated weight for copper (at density 9.3gr/cm^3) around 150-400gr (fig.6.22). Actual silver ingots tend to have a wider range of shapes, including rods, buns, wires, and tongue-shaped; the latter type is also represented by several ingot moulds from Marki on Cyprus

(Webb et al.2006:275-276). While gold specimens tend to be small (10-88gr), silver pieces can weigh up to 3.5kg and copper ones up to 1kg. Neither ingot moulds nor ingots seem to point to standardised weights, which is not surprising given that open-mould casting would not allow to control the weight of the resulting object with any degree of precision (Horejs 2009:365).

In addition to these well-recognised shapes, it has been suggested that flat axes may have also circulated as easily-convertible blanks or ingots, in particular the type with pierced butt which is well-represented in Cyprus and along the western and southern Anatolian coasts (fig.6.23, Horejs et al.2010:16; Webb et al.2006:264). A peculiar triangular ingot fragment from Poros-Katsambas on Crete seems alien to Anatolian and Aegean shapes and can be tentatively linked to contemporary Levantine ingot production (fig.6.21j-l, Doonan R et al.2007:105-106).

6.2.4 Metal provenance analysis

The scientific breakthrough in provenance analysis of metal occurred in the 1960s, with the realisation that different ratios in various lead isotopes (^{204}Pb, ^{206}Pb, ^{207}Pb, ^{208}Pb), dependent on the geological age of the mineral deposit, could be employed to identify the potential origin of metals with significant traces of lead embedded in it, such as copper, silver and of course lead (Brill and Wampler 1967; Grögler et al.1966). This discovery had, and still has, important ramifications in how archaeometallurgists can shed light on patterns of procurement and circulation of raw, semi-finished and finished metal products (discussed in section 6.2.4.2 below). Starting during the 1970s, metal provenance analysis has further fuelled an important debate on the potential sources of tin employed in pre-Classical Anatolia, Aegean and the Near East (cf. Dayton 1971; Muhly 1973; Yener and Özbal 1987; Weeks 1999, 2004). At the time, given the inability to directly analyse the origin of the tin, studies focused on the origin of the copper in the tin bronze alloys. More recently, there have been attempts to directly test the tin through the analysis of the ratios between its several isotopes (Balliana et al.2013; Clayton et al.2002; Haustein et al.2010; Yamazaki et al.2013; see also Brügmann et al.2015 for the presentation of a new ERC-funded project dedicated to explore it further). While the initial results seem promising, the technique is still at the experimental stage and has not been employed to any significant extent in Anatolia. A different method of metal provenance analysis has instead been employed on gold artefacts, based on the geochemical characterisation of the metal and the ratios of rarer elements embedded in the gold such as iridium, platinum and tellurium (cf. most recently Leusch et al.2014; Schlosser et al.2009). However, with the notable exception of Young 1972, no such analyses have been carried out on Anatolian materials.

The bulk of provenance analyses on Anatolian metals is thus limited to lead isotope analysis on copper-based objects, and to a much lesser extent to silver or lead artefacts. Notwithstanding the numerous limitations associated with this kind of analysis (explored below), it seemed worthwhile to proceed with a general re-assessment of the published results on c.35 sites. Figure 6.24 shows that most of the sites with lead isotope analysis come from the Aegean basin and the immediate neighbouring area, while central Anatolia is very poorly represented; results from Cyprus and eastern Anatolia have thus been included to understand broad patterns of metal procurement in the area.

6.2.4.1 Limitations of lead isotope analysis

Numerous hindrances affect the employment of lead isotope analysis, the most important of which is that the lead isotopic signature is often not unique for a single ore source, but is instead more commonly shared by different deposits with a broadly contemporary genesis that may however be far away from each other (Budd et al.1993; Pernicka 1993; Sayre et al. 1992; Stos-Gale 1992:155-156). Thus, establishing the origin of an archaeological metal is often a process of eliminating more distant sources if closer ones are available; but while an Occam's razor approach seems sensible from an analytical point of view, it is not necessarily always the case in the archaeological context. More importantly, an archaeological metal can be matched only to ores or slag that have been already recognised and analysed and whose lead signature is available to the research team, and is thus highly dependent on the intensity of research and the level of data-sharing.

An additional limitation is represented by the absence of recent work on EBA Anatolian metals: most of the studies were carried out in the 1980s and 1990s, essentially by four different laboratories (Smithsonian Institute, Oxford, Mainz and Heidelberg) that only recently have published their databases allowing a more articulated integration of the research. Today, the dataset of analysed ores and slag in south-eastern Europe, Aegean, Anatolia, Cyprus and the Near East is much larger than 30 years ago, with the consequence that some of the analyses published then could find matches today if they were to be re-assessed. However, with few exceptions (Begemann et al.2003; Gale 2008), no recent studies have attempted to integrate older data into the picture, and an independent re-analysis could not be performed in the context of this dissertation. Further, while episodes of re-melting seem overall to represent a small amount of all EBA metals (cf. section 6.2.5), combining metal of two objects from different sources would result in lead isotopic signatures averaged in the middle, thus providing a false reading.

6.2.4.2 A re-assessment of published lead isotope analysis

The sites located in north-west Anatolia and off-shore islands are the ones that have so far provided the most reliable datasets in terms of both sample size and chronological accuracy, with a coverage between c.2900-2200 BC.

Analysis from samples belonging to the c.2900-2600 BC period, represented by Thermi levels I-IV, Poliochni levels Blue-Green and Beşiktepe, indicates that the majority of copper comes from locally-available deposits in north-western Anatolia, particularly from the mines of Gümüşköy and Balya/Serçenörenköy and with minor additions from smaller nearby deposits (Begemann et al. 1992, 2003; Pernicka et al. 1990; Stos-Gale 1992). The remaining share is represented by copper coming from the Cyclades (Kythnos and Siphnos), from the eastern Black Sea (Murgul mine and nearby sites) and from the Taurus mountains, occurring in different proportions at each site. Interestingly, both at Thermi (since the earliest level I) and Beşiktepe there are a few objects whose isotopic signature does not match any known ore/slag in Anatolia, Bulgaria or the Aegean and indicates a metallogenetic age much older than deposits found in the area (Begemann et al.2003:200; Stos-Gale 1992:170). The lead and silver objects from Poliochni Blue-Green and Thermi IV seem to come from local sources (most likely Balya), with the notable exception of a double-spiral pin from Poliochni Blue (typologically alien to local manufacturing traditions) whose only isotopic match is a 1st millennium Achaemenid vase (Begemann et al.1992:fig.5; Pernicka et al. 1990:279-280).

The c.2600-2200 BC period is represented by samples from Thermi level V, Poliochni levels Red and Yellow, and the poorly stratified assemblages from Troy (Begemann et al.1992; Gale 2008; Gale et al.1984, 1985; Pernicka et al.1990; Sayre et al.1992:89-96). This later phase, in concomitance with the development of interregional exchange networks discussed in more detail in section 7.2, witnesses a surge in the range of copper sources and the quantity of non-local metal arriving on site. While local and Cycladic coppers continue to be present, eastern Black Sea, northern Anatolian and Taurus mountains deposits become more prominent, as seen particularly well at Poliochni (Pernicka et al.1990:fig.7). Also, an increasing larger number of artefacts (already encountered in the earlier phase) do not have isotopic signatures matching any of the known Balkan, Aegean or Anatolian deposits. During the 2600-2200 BC period, they are tightly (though not exclusively) associated with tin bronzes, supporting the idea that many of the semi-finished or finished bronze products were arriving on site already alloyed (Begemann et al.2003:200; Gale 2008:207-209). While their origin is still unknown, the same isotopic signature has been found in a large number of Mesopotamian objects from ED III and Akkadian periods (c.2600-2200 BC), though notably not in western Iran, where tin bronzes were made with local tin sources and local copper: thus, these alloyed tin bronze artefacts may have arrived in Anatolia via Upper Mesopotamia (Begemann et al.2008:39-40). In this phase, also silver artefacts show a widened range of origins, with the addition of Lavrion and Siphnos to the already existing north-western Anatolian source of Balya (Pernicka et al.1990:279-280; Sayre et al.1992:88-91). The late EBA site of Kanlıgeçit in eastern Thrace sets a contrast with the trend seen in contemporary sites in north-western Anatolia: all three copper-based artefacts from phase KG 2 (c.2500-2200 cal BC) are coming from deposits located in the nearby İstranca mountains (Yalçın 2012:187), a source whose signature however does not match any other artefacts elsewhere in Anatolian or the Aegean.

Throughout the 3rd millennium, the Cycladic deposits of Kythnos, Siphnos and Seriphos and Lavrion in Attica are the likely origin for the vast majority of copper, lead and silver objects circulating in the southern and central Aegean (Kayafa et al.2000; Sayre et al.1992; Stos-Gale and Gale 2006). North-western Anatolian sources are the largest non-local addition, and are present at a number of sites including Amorgos, Kastri on Syros, Sitagroi and possibly Lerna as well (Kayafa et al.2000:43; Sayre et al.1992:89; Stos-Gale 1992:169-170). The late 3rd millennium assemblage of Kastri on Syros seems unique in this panorama, not only for its large ratios of tin bronzes that contrasts with the predominance of arsenical copper at most of EBA western Aegean sites, but also because of the higher proportion of copper from Troadic sources. Furthermore, a group of tin bronzes has the same "alien" isotopic signature encountered in north-western Anatolian sites discussed above (Gale et al.1984:32). This isotopic signature has been further found on two objects in EH Lerna and Lithares, one arsenical copper and one high-grade tin bronze (Kayafa et al.2000:43). This suggests that, already by the mid-EBA, north-western Anatolian sites may have funnelled both already-alloyed bronzes and copper of unknown origin to the southern Aegean. Intriguingly, a copper-based fishhook from Lithares has the same isotopic signature as a large number of artefacts distributed in south-eastern Anatolia, and possibly coming from the Aladağ deposits in the Taurus mountains (Kayafa et al. 2000:44). Lastly, the Cypriot origin of a small number of artefacts has been reported at late EH II (c.2400-2200 BC) Tsoungiza, EH III Lerna and in EM Crete (Kayafa et al.2000:43-44; Webb et al.2006:277).

Analysis performed on inland western Anatolian sites has overall produced a much more limited dataset, with less detailed chronological accuracy and essentially restricted to two sites, Yortan and Beycesultan (Gale et al.1985). Both cases however seem interesting because they present a different pattern from that observed in north-western Anatolian sites: the six EBA samples from Yortan (c.2600-2300 BC)[48] point to a single source, which is however different from that of copper employed at Troy, and the same applies for the six LCh and two EBA samples from

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[48] Object cat.no. 11795 is a shaft-hole spearhead in tin bronze that typologically does not belong to EBA traditions, and was thus excluded from the discussion.

Beycesultan, coming from a single deposit that does match either Yortan or Troy objects (Gale et al.1985:158). This indicates that both sites may have tapped into local resources that were not known at the time of publication, an idea that is further confirmed by the fact that both assemblages lack tin bronzes and contain significant quantities of arsenic, co-occurring with copper ores in deposits close to Yortan and Beycesultan (fig.6.12). Of relevance here is an early provenance analysis (based on trace elements) performed on several gold artefacts in the Boston Museum of Fine Arts (Young 1972). Numerous pieces of jewellery coming from an ED III grave at Ur (c.2600-2500 BC) and from an Egyptian hoard (c.2500-2450 BC) revealed the inclusion of platinum and iridium in ratios that match Lydian gold coins and other Achaemenid artefacts (c.500-400 BC) and are consistent with gold coming from the placer near Sardis, situated c.2,000-2,500km away from their context of deposition. Interestingly, most of the analysed artefacts are typologically alien to EBA Anatolian manufacture, suggesting that Anatolian gold may have been re-melted and re-shaped to suit local taste.

The Taurus silver and copper deposits seem to play an important role in the composition of EBA metal assemblages in northern Anatolia, Cilicia and Mesopotamia. The Aladağ deposits match a large number of artefacts, including six silver bun ingots from Mahmatlar (in northern Anatolia), an “EB III” lead coil from Gözlükule, a silver statuette and several copper-based artefacts from Tell Judeideh, an EB IV lead coil from Tell Selenkahiye, 13 lead/copper implements from EB I-II Hassek Höyük and seven silver-copper alloyed objects from the Arslantepe "Royal" grave (Hauptmann et al.2002:60; Sayre et al.1992:96; Yener et al.1991:555-556). Furthermore, lead isotopic signatures of several silver objects from Assur, Ur, Khafaja, Tello and Tell Raqa’i in Lower Mesopotamia (dated c.2500-2000 BC) have good matches with the Taurus deposits (Yener et al.1991:561-566). Several EBA copper-based artefacts (seven from Amuq sites, one from Gözlükule and two from Yumuktepe) have been assigned to Taurus 1A and 2B sources (Yener et al.1991:555-556). Of great relevance is a recent analysis on 215 metal artefacts coming from 25 Upper and Lower Mesopotamian sites, spanning from the late 4th to the late 3rd millennia: the results indicate that during the Late Uruk period (3300-3000 BC), the most important sources of copper-based artefacts (18 out of 23 samples) are the Ergani Maden area, followed by northern Anatolia (Çorum mines) and the Taurus mountains. In the Jemdet-Nasr and ED I phases (3000-2800 BC) Taurus and northern Anatolian copper are still an important component of the assemblages, but central Anatolian copper becomes almost non-existent in Lower Mesopotamia during the following ED II-Akkadian periods (c.2800-2200 BC), when a much wider range of sources were tapped, among which Iran, south-eastern Anatolia, the Caucasus, Oman and the Jordan valley (Begemann and Schmitt-Strecker 2009:21-26).

A recent programme of lead isotope analysis on northern Cypriot assemblages also seems to indicate that, during the late 3rd millennium, a wide range of metal from different sources was present on the island. Aside from copper extracted from local deposits, the origin of several copper-based artefacts could be pinpointed to the Cyclades (deposits in Lavrion, Kythnos and Seriphos), the Taurus mountains and the Ergani Maden complex (Webb et al.2006; Stos-Gale and Gale 2010). Intriguingly, the results indicate that two out of three tin bronzes, a rat-tang sword and a spearhead typologically correlated with central Anatolian production, were coming from the Bolkardağ (Taurus), suggesting that Kestel tin might have been used in the alloy. A third object was instead produced with Cypriot copper, corroborating the idea that tin ingots may have to some extent circulated as well and that tin-copper alloys may have been produced in areas where tin was not locally available (Webb et al.2006:276). Finally, despite the general dearth of provenance analysis in the Levant, already in the early 3rd millennium there are a few copper-based objects whose origin are probably the Taurus Mountains, at Tell as-Shuna, Pella and Khirbet al-Batrawi; Cypriot copper is also present at Pella since the earliest 3rd millennium (Nigro 2014; Philip et al.2003).

While a more detailed discussion that combines further work on copper alloys will be presented later (section 6.2.6), some patterns seem already clear and will be briefly summarised. Unsurprisingly, throughout the EBA the majority of metal assemblages at individual sites seem to have originated from copper deposits located between 20 and 400km away. This is particularly interesting in north-west Anatolia and the Cyclades, where local deposits are relatively small and are not of economic interest in today's global market exchanges. On the other hand, most sites yield small amounts of metal whose ultimate origin can be pinpointed at sources between 800-1,500km away, a pattern that is already visible in the early EBA at sites in north-western Anatolia and that becomes increasingly prominent during the late EBA, for example in Cyprus and the southern Aegean. Of relevance for later discussion is also that the lead isotopic signature of tin-copper alloys presents a complex picture: in some cases it seems plausible to suggest that tin was circulating separately (in ingot form?) and was admixed with local copper (e.g. some objects in north-western Anatolia and Cyprus), while in other cases tin was circulating already in alloyed form with copper from unknown sources outside Anatolia and via Upper Mesopotamia, at distances that most likely exceed 2,500km.

6.2.5 Copper alloys

Metal composition analysis seems of great importance to understanding broad patterns of interaction, both concerning exchange of information (technological know-how) and goods (semi-finished and finished products). The occurrence of particular alloys over large areas can be an indication of sharing of metallurgical knowledge, while the distribution of rarer alloys in a specific region can provide some hints about the possible origin of the rare metal part of the alloy. And finally, the proportion and distribution of tin bronzes can provide great insight into mechanisms of tin procurement across Anatolia. As with other analytical techniques, metal chemical composition analysis is flawed in many respects, though understanding these limitations can allow a certain degree of integration of the data and assess them within an analytical context.

6.2.5.1 The dataset

The dataset is composed of c.1,400 samples from 39 sites across west and central Anatolia, spanning from mid-4th to late 2nd millennia (figs.6.25a-b); for analytical purposes they have been divided in two groups (those studied before 1980s or after 1980s). Figure 6.26 shows a clear difference in the proportions of tin bronzes in different types of contexts, with higher proportions recorded among artefacts that were intentionally deposited in hoards and graves; this is something to bear in mind when comparing the data since the majority of the artefacts (892 out of 1401, 64%) comes from unintentional deposits in settlements. Several sites have a long chronological coverage that allows following the occurrence and abundance of copper alloys across several hundred years or more.

6.2.5.2 Analytical limitations

A substantial proportion of the sampled artefacts (46%) is composed by the dataset of the Stuttgart programme carried out in the 1960s with electron probe analysis (Esin 1969), a method that however is prone to inaccuracy in calculating metal content, as detectable when compared to more recent equipment such as INAA (e.g. Kuruçayırlı and Özbal 2005). The only detailed re-analysis of Esin's samples at Troy showed a consistent mismatch for percentages of As and Sn normally ranging within c.30% too high or too low, however with no apparent correlation between the deviation and the relative content of As/Sn (Pernicka et al.1990:274). This notwithstanding, since the Stuttgart's dataset represents an internally-consistent sample analysed with the same technique and by the same researchers, it seemed important to include it into the following analysis by critically assessing and contextualizing it with the newer results. What needs to be kept in mind is that the old Stuttgart samples mostly cover central Anatolian sites that have not received further attention more recently, thus the discrepancies between the newer (post-1980s) and older (pre-1980s) analyses are not only dependent on different analytical methodologies but also real differences in patterns of metal production. A smaller problem is represented by the recent use of non-destructive techniques (e.g. pXRF) on a limited number of samples (fig.6.25b) that, while allowing sampling a much larger number of artefacts, can only analyse the object surface. Since most prehistoric copper-based alloys have a clear tendency to segregate, particularly on the surface, non-destructive analysis generally overestimate the ratios of secondary metals in the alloy.

6.2.5.3 Intentional versus accidental alloying

Arsenical bronzes, the earliest metal alloys in Anatolia, appeared for the first time in the early 4th millennium, followed by copper alloys with lead, zinc, silver, antimony and nickel around mid-4th millennium, and tin bronzes in the early 3rd millennium (Pernicka 2014). Their earliest occurrence is roughly contemporarily with the earliest documented employment of sulphidic copper ores (at Çamlıbel Tarlası, c.3700-3600 cal BC) and this is probably more than a simple coincidence, since most of the Anatolian sulphidic copper ores are polymetallic and contain a large range of other minerals often in significant proportions. While the first experimentation with smelting may have resulted in the accidental discovery of natural alloys, it seems likely that LCh/EBA metal smiths may have quickly understood that the combination of copper with other minerals often produced higher-quality artefacts, and may have attempted to reproduce chance alloys in a more controlled fashion, for example by selecting arsenic-/lead-/nickel-/antimony-rich ores. There is however good evidence that, early on, arsenical bronzes may have been produced with the intentional addition of arsenic-rich minerals to the smelted copper, e.g. at LCh İkiztepe and Çamlıbel Tarlası, and early EBA Poros-Katsambas (on Crete) and Çukuriçi Höyük (Doonan R et al. 2007:112-113; Horejs and Mehofer 2015; Özbal et al.2002; Schoop 2011b; cf. also Pernicka 2014:454 discussing Iranian contexts). By 2600 BC, when tin bronzes often compose a significant proportion of the metal assemblages, there is a clear bimodal pattern where tin and arsenic are mostly employed alternatively and ratios of both Sn and As above 2 wt% are very rare, again suggesting a conscious alloying procedure (fig.6.26, Gale et al.1984:31; Pernicka et al.1990:273). There is a long-standing discussion regarding the threshold above which an alloy should be considered intentional (e.g. De Ryck et al.2003:579-580; Gale et al.1985:145; Webb et al.2006:274). Experimental analysis has however recently shown that, in ratios above 2 wt%, secondary metals in the alloy start changing both the mechanical properties of the copper (fluidity, hardness, fragility) and its colour (gradations of silvery and golden hues), thus suggesting that these differences may have also been recognisable by prehistoric smiths (Muhly 2006:163-164). Thus, the 2 wt% threshold for intentional alloy (through either ore selection or addition of separate minerals to the mix) has been chosen for the following analysis.

6.2.5.4 Rarer copper alloys

With the notable exception of Arslantepe's "Royal" grave that is almost exclusively composed of silver-copper and arsenic-nickel-copper artefacts, copper alloys with metals other than arsenic and tin are always a small minority in EBA metal assemblages (generally around 2-4%, fig.6.27). Silver-copper alloys first occur in Anatolia around mid-4th millennium and appear almost contemporarily in an area spanning from the Carpathian basin to Lower Mesopotamia (Hauptmann 2002:57; Horejs et al.2010:21-24). A similar pattern can be seen with lead-copper alloys, distributed over a very large area from the western Aegean to Lower Mesopotamia (Moorey 1994:257 for Mesopotamian artefacts). As also in the case for arsenic-copper alloys, rather than assuming a single origin of the objects this pattern likely reflects relatively quick and widespread exchange of metallurgical know-how across large areas. There are however alloys with rarer metals, such as antimony and nickel (often co-occurring with arsenic), that can be traced back to a much more limited range of possible sources and that have a more defined spatial distribution. Despite efforts to locate alternative deposits in the Near East (e.g. Goren 2008:75), the most probable source of antimony remains the Niğde massif (Taurus mountains), while nickel-rich deposits seem limited to the Antitaurus mountains, particularly around the Ergani Maden (Hauptmann et al.2002:60). While the distribution of LCh/EBA antimony-arsenic-copper and nickel-arsenic-copper alloys is quite wide (fig.6.28), it fits rather well with the distribution of other classes of archaeological evidence affiliated with the interregional networks between the Levant/Mesopotamia and Anatolia (sections 7.2.3, 7.2.4). Thus, while at present unconfirmed by lead isotope analysis, it can be suggested that at least in some cases the metal employed in the production of these artefacts may have originated in Anatolia. Interestingly, a few arsenic-nickel-copper alloys were found in EM contexts in Crete, at Poros-Katsambas, Chrysokamino and the Mesara valley (Catapotis and Bassiakos 2007:72-73; Doonan R et al.2007:106), suggesting that small amounts of copper from Antitaurus sources may have circulated in the southern Aegean.

6.2.5.5 Arsenic versus tin alloys

The assessment of broad patterns of circulation of arsenic versus tin bronzes is rather complex, and would certainly require a much more extensive treatment than is provided here. The coverage of the analysed sites is uneven under many parameters, including the spatial and chronological representativity, the sample size, the methods employed in the analysis and the context types of the datasets. However, some general trends across west and central Anatolia can be identified (fig.6.27): unalloyed copper (with minor occurrences of other metals never above 2 wt% each) and native copper (with only trace elements, never above 0.2 wt% each) seem to represent a substantial proportion of all metals in the 3rd and 2nd millennia (29-45% of total). In the same chronological span, arsenical bronzes seem to gradually lose importance, from c.38% in the “EB I” to c.9% in the LBA, and this is inversely correlated with the gradual increase of tin bronzes from c.4% in the “EB I” to 49% in the LBA. The substantial drop in the proportion of tin bronzes during the MBA is at least in part an analytical bias created by three concomitant elements:

a) the absence of sampled MBA funerary contexts,

b) the predominance of pre-1980s analyses on the early 2nd millennium assemblages that likely underestimated the quantity of both tin and arsenic,

c) the absence of analyses in western Anatolia, and area that provides some of the richest tin bronzes assemblages in earlier and later periods.

Ternary alloys of arsenic-tin-copper (with Sn and As above 2 wt%), arguably the most direct evidence of re-melting from different objects, are overall very rare throughout the EBA, MBA and LBA, between 0.8-3.4%.

Looking in more detail at the spatial distribution of tin bronzes, they start appearing in Anatolia in very small quantities around 3000-2700 BC (fig.6.29): in south-eastern Anatolia at Tell Judeideh phase G and Qara Quzaq, in the Kızılırmak bend at Alişar Höyük level 13M and Alacahöyük grave L (c.3000-2650 cal BC), and in the eastern Aegean at Beşiktepe "Troy I levels", Limantepe VI, Thermi I and Sitagroi IV (Begemann et al. 2003; von der Osten 1937c:338-339; Keskin 2009:appendix 9; Muhly 2006.171; Stos-Gale 1992; Yalçın and Yalçın 2013:42-44; Yener 2009:144-145). At Limantepe, Thermi, Alacahöyük and Beşiktepe there are some artefacts with high tin percentages (c.9-11 wt%). After c.2700 BC, tin bronzes start to become more common, particularly in north-western Anatolia and the Kızılırmak bend, where they compose between 45-70% of the total metal assemblages and are composed of high-grade tin alloys, i.e. 8-12 wt% tin or more (figs.6.30-6.31). In other areas, the absence or scarcity of tin bronzes persists until the later 2nd millennium (fig.6.32), e.g. in inland western Anatolia, where tin bronzes are completely absent from the analysed dataset (Yortan, Bayındırköy and Beycesultan, and MBA Ilıpınar) or are present in small quantities and with a low tin content below 6 wt% (MBA Beycesultan, EBA/MBA Kusura, EBA Karataş). A very similar pattern can also be detected in Cilicia where, despite higher proportions of tin bronzes at Gözlükule and Yumuktepe, tin content is always between 2-6 wt% of the alloy.

While in some cases (e.g. Yortan, Bayındırköy, Ilıpınar and Karataş) the considerable distance from the main routes may be advocated to explain the scarcity of tin bronzes, the same cannot be applied to Gözlükule, Yumuktepe, Beycesultan and Kusura, certainly important settlements on the main routes. The predominance of arsenic over tin may have been to some extent dictated by cultural preferences, though it can be noted that all the mentioned sites are quite close to arsenic-rich copper ores (fig.6.12), thus the local availability of arsenical bronzes may have played an important role.

With the exclusion of the Levant and Upper Mesopotamia, the regions surrounding the Anatolian peninsula have overall very little amounts of tin bronzes during the EBA. In eastern Anatolia, they do not occur in Arslantepe and other sites until the late 3rd millennium (Hauptmann et al.2002:53; Yakar 2002), and the same can be said for Cyprus, where even in the Philia and Early Cypriot phases they represent a small minority of the total assemblages (Webb et al.2006; Stos-Gale and Gale 2010). In the western and southern Aegean (with the notable exception of Kastri on Syros) tin bronzes are very rare before the MBA: a review shows that in EM and MM Crete less than 7% of the sample is composed of tin bronzes, a figure matched in mainland Greece as well, with 8% (Pare 2000:10-11). In south-eastern Europe, tin bronzes are similarly scarce (Pare 2000:12-13). These data clearly contrast with the situation in Anatolia, where both new and old analyses agree that c.21-22% of all “EB II” artefacts and 37-39% of all “EB III” objects are made of tin bronze, with proportions often exceeding 50% of the total assemblage at several sites.

While Anatolian tin from several sources in the Taurus mountains (including Kestel and Hisarcık) was most probably exchanged within Anatolia, there is some evidence that a proportion of already-alloyed tin bronze artefacts may have reached central and west Anatolia via Upper Mesopotamia. Chemical composition analysis from Tell Brak and Tell Mozan in eastern Syria revealed that even during the Akkadian period the ratio of tin bronzes was overall below 10% (Moorey and Schweizer 1972:186-187; Northover 2001; Tonussi 2007:102), while Tell Beydar, further to the west, started acquiring substantial quantities of tin bronzes (37%) only during the ED III period (De Ryck et al.2003). The tin routes may have closely followed the course of the Euphrates via sites like Mari, Emar, Tuttul and Carchemish (Tonussi 2007:349-350). Given the absence of tin bronzes in eastern Anatolia and their scarcity in Cilicia, the results presented above also strongly suggest that the most likely entry point of non-local tin into Anatolia was located in the area around Kültepe, from which it was further exchanged to the north (within the Kızılırmak bend) or followed routes in the northern part of the plateau until north-western Anatolia (fig.6.33). The importance of Kültepe as a network hub for the EBA interregional exchanges is, among other elements, witnessed by the largest public building to date in Anatolia, the range of Mesopotamian goods and the presence of several thousand Upper Mesopotamian sealings found in late EBA levels (fig.1.17, sections 5.2.2, 7.2.3).

6.2.6 The production and circulation of metal in EBA Anatolia

The analyses presented above indicate that in EBA Anatolia metal working was a widespread activity, with a large number of potential deposits and extensive archaeological evidence for mining, refining and manufacturing sites. Previous research has suggested that during the 3rd millennium metal production and circulation may have entailed a multi-tiered organisation, with different processing steps located in geographically distinct areas in the uplands and lowlands (Lehner and Yener 2014:545; Yener 2000; Yener et al.2015). While at the moment we have no geographic continuity in the archaeological investigation of metal production (most of the well-investigated upland sites are located in the Taurus mountains and the Kızılırmak bend, evidence for lowland sites comes instead mostly from the area around the Aegean coast), the analysis presented here seems to confirm this hypothesis and further adds significant evidence for the articulation of EBA production and circulation networks.

The different stages of primary metal production (e.g. ore-crushing, ore enrichment, roasting in case of sulphidic copper ores, smelting, often in several cycles) were mostly conducted close to the mines themselves and in the adjacent settlements, as witnessed for example by the EBA Kestel/Göltepe and Derekutuğun mining complexes and by the large quantities of slag found generally in the immediate proximity of most extracting sites. This idea is further supported by two considerations: roasting (in case of sulphidic ores) and smelting would have required very large quantities of fuel that would have been arguably easier to supply in the uplands near the mines themselves. For instance, in AD 19th century Black Sea, c.260 tons of timber and 60 tons of charcoal were necessary to smelt 1.8 tons of argentiferous lead (Yener 2000:78). And second, the ratio between ore and final product was so disproportionate that transportation of unprocessed ore over large distances would have made it economically unfeasible, unless made necessary by the scarcity of timber near the extraction sites. It has also been suggested that, at least in the case where mines/primary smelting sites were located at high altitudes (e.g. Göltepe and Çamlıbel Tarlası), metal extraction may have been a seasonal occupation. While smaller enterprises certainly existed, the archaeological evidence at Göltepe further shows the involvement of several hundred people in the process of mining and ore refinement, indicating a rather complex work organisation and quantities of finished product well above the need of nearby communities. The available evidence for secondary production sites suggests that they were located in the lowlands, were embedded within larger settlements and were essentially involved in the manufacture of finished and semi-finished products, likely from ingots and re-melted metal objects. At present, three different types can be recognised:

a) independent small-scale workshops managed by a group (an extended family?) of full-time specialists (often more than one in a settlement, e.g. at Poliochni and Thermi),

b) highly-specialised workshops whose production was essentially restricted to elite groups,

c) occasional production of simple objects carried out by part-time specialists in smaller settlements.

Better-investigated metal workshops along the Aegean coast support the idea that metallurgical activity was an important component of the overall economy of the site and that it was carried out for several centuries in the same place, often within the same building.

With regard to the circulation of metal and the reconstruction of possible networks, given the property of metal to be re-melted innumerable times, one has to be aware that the depositional context is only the last of many possible steps in the circulation of metal (from mine to workshop to settlement to other settlements), and be very cautious in equating origin-destination as a linear journey and assuming that the final shape was maintained throughout the life of the metal (cf. Doonan and Day 2007:6-10). However, even though a "down-the-line" exchange for some metal artefacts can certainly be imagined, it seems that already in the early EBA direct exchanges over considerable distances may have been in place. For instance, lead isotope analysis indicates that, while the majority of the copper comes from relatively close sources, already in the early 3rd millennium and significantly more so in the later EBA other sources much farther away (between 800-1,500km) can be identified. This is even more obvious with the distribution of the non-local tin bronzes, that were reaching Anatolia in alloyed form via Upper Mesopotamia and likely from sources more than 2,500km away from their depositional contexts in the Aegean. Anatolian tin bronzes with a characteristic "old signature" for the copper (not individuated so far in any analysed sample from south-eastern Balkans, the Aegean, Anatolia and Iran) seem to have occurred in larger proportions during the late EBA, particularly around and after the "Troy IIg horizon", i.e. 2300-2200 BC. This phenomenon is broadly contemporary with the cessation of extraction activities at Kestel around 2200-2100 cal BC. It has recently been suggested that this surge may be correlated with a major shift in the circulation of tin, and the introduction into the market of central Asian and Iranian tin products (Lehner et al.2015:205-209; Stöllner et al. 2011:231-232). In this model, cheaper and more-easily produced eastern tin may have to some extent gradually supplanted locally-extracted tin. While the first evidence for extraction and circulation of central Asian and Iranian tin dates, at present, to the early-mid 2nd millennium (Nezafati et al.2008, 2009; Parzinger 2002; Stöllner et al. 2011), this hypothesis is supported by extensive written evidence that indicates the origin of tin to the east of Mesopotamia proper (Larsen 1976, 1987). At present, however, solid evidence for the exploitation of tin mines in Iran and central Asia during the late 3rd and earliest 2nd millennia is still lacking, and the origin of "old signature tin" is not resolved. In any case, the occurrence of such tin bronzes across Anatolia, the Aegean and Mesopotamia indicates the intensification of interregional exchanges in the late EBA, a phenomenon also matched by other archaeological evidence (sections 7.2, 8.3). The scale of some mining and refining facilities and the prosperity of secondary metal production sites further hints at the important role played by metal in the panorama of EBA exchange networks. The circulation of ingots already in the early 3rd millennium also points out the high degree of complexity in the organisation of metal trade, since they are a form specifically designed for easier transportation in bulk quantities and their exchange value lies in the weight of raw material rather than in the shape/quality of the finished product.

Contemporarily, two different weight systems appear in the area, one in the Aegean employing the Levantine units of measure, the other in inland Anatolia using the Upper Mesopotamian standard (section 5.1). The stone weights are in most cases between 5 and 100gr, and the balance beams between 13 and 20cm, indicating that they are most likely employed in the weighing of low-volume/high-value products. In some cases, weights are directly associated with metallurgical activities (at Poliochni, Thermi, Kestel and Çukuriçi Höyük), strengthening the idea that they might have been used in the context of metal exchange, particularly of precious metals like silver, tin and gold. This implies that a part of the metal trade was based on a standardised (albeit probably fluctuating over time and space-dependent) system of values, and regulated by issues of economic profitability rather than reciprocity/gift mechanisms.

While the extent of the exchange networks will be discussed in more detail in chapter 7, if we combine the location of the main metal-producing areas with that of the reconstructed EBA sea/land routes and the larger known sites (cf. chapter 3), we can start suggesting the possible location of some of the main centres involved in the metal exchange (fig.6.33). Troy, Poliochni, Limantepe, Milet, Acemhöyük, Eskiyapar, Alacahöyük, Kültepe, Arslantepe and Gözlükule are all large settlements (up to c.20-30ha in size) with extensive evidence of interregional contacts, are close to important metal-producing areas and are at the intersection of two or more main route trunks. Though other less well-investigated centres certainly existed, these can be identified as some of the major players in the metal exchanges. It is unlikely that they directly managed the whole metal manufacturing process (unless when mines were in a 15-20km range from the site), but there is indirect evidence that they may have had control over the access to routes (section 1.5.2).

Of great relevance for the broader topic of this PhD, the analyses in this chapter substantiate the evidence for the existence of two important exchange routes, one following the southern Anatolian coast, the other spanning from the Middle Euphrates valley to the Troad (section 7.3). This is suggested by several strands of evidence: for instance, lead isotope analysis shows that after 2400 BC small amounts of Cypriot copper are present both on the Greek mainland (at Tsoungiza and Lerna) and on Crete, and similarly Cycladic copper is present in Philia phase assemblages on Cyprus. Antitaurus metals are also circulated in small quantities in Cyprus at the same time, and possibly minute quantities of Taurus metal reach mainland Greece as well, as suggested by the single arsenical copper artefact from Lithares. Additionally, a peculiar type of flat axes with pierced butt (possibly blanks/ingots) is essentially distributed along the eastern Aegean seaboard, southern Anatolian coast, Cyprus and the southern Levant, and a triangular ingot fragment from Poros-Katsambas on Crete is a likely match with contemporary Levantine specimens. And finally, a few EM Cretan daggers were found in Lapithos and Vounous on Cyprus (Kayafa et al. 2000:48), while on Crete (at Poros, Chrysokamino and the Mesara valley) there are a few objects characterised by a rare arsenic-nickel-copper alloy, whose origin is likely the Antitaurus mountains.

The other major phenomenon is represented by the exchange networks occurring between Upper Mesopotamian and Levantine polities and the area west of the Taurus mountains, which arguably profoundly shaped the trajectory of social complexity in west and central Anatolia across the 3rd millennium and drove forward the integration of this region into the Near Eastern cultural sphere. Despite the dearth of provenance analyses on Mesopotamian artefacts (particularly for silver and gold objects), recent work has proved that small amounts Taurus copper were present both in Upper and Lower Mesopotamia already in the late 4th millennium, and that northern Syrian sites continued to receive Taurus copper and silver throughout the 3rd millennium. Early analysis on artefacts from the "Royal" Ur cemetery (c.2600-2500 BC) also indicates that western Anatolian (Sardis) gold was circulating as far as 2,500km away from its source, while lead isotope analysis on Lower Mesopotamia silver artefacts suggests their origin in the Taurus Mountains, c.1,500km away. Conversely, large centres in western Syria may have funnelled significant amounts of already-alloyed tin bronzes westwards across the Taurus mountains as early as Thermi I (c.2900-2800 BC).

Chapter 7: The circulation of finished artefacts

While chapters 5 and 6 have focused mainly on technology transfer and procurement of raw materials, this one is, by deliberate contrast, centres on the circulation of finished products, and aims at highlighting not only artefact exchange in different socio-economic contexts and at different spatial scales, but also the flows of ideas and behaviours behind both production and consumption. With this in mind, a range of case studies will be employed to identify distinct (albeit interlocking) interaction networks, and to recognise the variety of exchange mechanisms and routes facilitating interaction. It will also seek to consider particular classes of empirical evidence, in order to understand, for any given chronological episode within the EBA, whether it was the organised movement of people (who carried the objects and technological know-how with them), the inter-personal exchange of goods, the transfer of the technology to produce them and/or rather the circulation of the ideas behind the items themselves. Several of the case studies will also offer the opportunity to identify the origin of specific artefact types, the possible routes for their diffusion, and the way they were adapted and imitated at the local level.

As this dissertation project gradually evolved and expanded to cover other classes of evidence, I chose to substantially reduce the emphasis on the circulation of finished goods, with the result that a number of object types initially selected for analysis here cannot be thoroughly presented for lack of space. I therefore made an opportunistic choice over what to include and how thoroughly to discuss each artefact class, depending on the quality of the available dataset, the presence of other well-published works on it, and the relevance of each class for the broader themes of the dissertation. In fact, I have dedicated a substantial portion of this chapter to only two case studies (anthropomorphic figurines and loomweights), because they represent valuable proxies for smaller-scale, non-elite forms of interaction, a topic has have been so far only very rarely been tackled in the published literature. Conversely, a range of already well-published Mediterranean and Near Eastern luxury goods will by contrast only be briefly mentioned with regard to their Anatolian context here, as they have already received thorough treatment. Additionally, the analysis of architectural features and funerary customs will be briefly discussed and employed in different sections because of their importance in highlighting interaction networks within Anatolia and surrounding regions. The chapter is divided in three main parts; the first (section 7.1) is devoted to analysing interaction between different areas of west and central Anatolia, the second (section 7.2) looks in more detail at contacts between west/central Anatolia and surrounding regions, while the third (section 7.3) provides some preliminary conclusions.

7.1 Interaction within Anatolia

7.1.1 Anthropomorphic figurines

Figurines are among the most common objects in any archaeological EBA assemblage, and because of their supposed symbolic connotations they are generally well represented in publications, with over 540 recorded specimens across c.70 sites (figs.7.1-2). Most EBA anthropomorphic figurines are small in size and weight, are flat and cannot stand, and are seemingly made to fit into a pocket/pouch or to be displayed in niches or on benches. While stone figurines in general lack any recognisable anatomical detail, most of the terracotta and metal EBA specimens have either female or asexual attributes (c.97% of the total), a pattern that strikingly contrasts with MBA figurines, where 33% of the total depicts male figures (Bilgi 2012:table 23; Makowski 2005:20-22). Despite the fact that comprehensive catalogues of Anatolian figurines have been recently published (Aydıngün 2006; Bilgi 2012), there has been so far little effort to create a coherent framework to study them, a problem that partly relates to the scarcity of information attached to most of these finds. To date, there is little shared terminology or any chrono-typology of these objects, and the brief works of Maciej Makowski (2005) and Shannon Martino (2014) are the only ones to have raised issues about their supposed function, while Deniz Sarı's analysis represents the first attempt to map (some of the) EBA figurine types in western Anatolia and to discuss their connection to networks of regional exchange (2011). The following analysis builds up on their research with the explicit goal of better defining the spatial distribution of individual types and their context of manufacture and circulation, looking at better-known excavated contexts. However, for lack of time and space, the classification presented below is not representative of the full range of EBA figurines present in west and central Anatolia but focuses on types that are more readily identifiable. This particularly applies to the terracotta specimens, whose manufacturing medium (clay) and production context (individual households?) promoted a much higher variability than stone and metal figurines. A particular group of late EBA/early MBA lead figurines will be discussed separately in section 7.2.3.3 due to their connection with interregional exchange networks.

7.1.1.1 Materials

While there is a considerable overlap in the distribution of materials employed for the creation of figurines, with different media often present on the same site and in the same levels, some broad differences can be highlighted. Stone (and more specifically marble) is the favourite medium for figurine production in the western Anatolian highlands and the Büyük Menderes-Gediz triangle, an area that also hosts most of the known marble quarries in Anatolia (fig.7.3).

Around c.2600-2400 BC marble figurines start appearing on the western fringes of the plateau (e.g. at Demircihöyük, Küllüoba, Konya-Karahöyük) and, by virtue of their typology and their material, it is possible to suggest that they represent a direct import from inland western Anatolia. During the same period, figurines in south-western Anatolia and Sakarya/Porsuk plains are produced with local stones (e.g. limestone, sandstone) but imitate the marble types. On the other hand, terracotta figurines are present in substantial quantities along the north-western Anatolian seaboard, especially in the early EBA, and terracotta production dominates the assemblages on the central plateau. A notable exception is represented by the so-called "alabaster idols" (probably made of gypsum), restricted to Cappadocia and to the late EBA period. A gypsum quarry has to be assumed in the area around Kültepe, which is the provenance for c.80% of all "alabaster" figurines. Metal is an uncommon medium for figurine production (but also possibly less archaeologically-visible) and is at present limited to a few pieces within the Kızılırmak bend.[49]

7.1.1.2 Figurine typology

For sake of clarity and continuity with previous literature, the existing typological terminology has been employed whenever possible. Three main styles can be distinguished in the Anatolian EBA figurines, each with several types, and different production media tend to cluster in one of these styles:

I) ***Schematic style*** includes all stone figurines produced in Anatolia, with the single exception of type III.2 described below. They are flat and are generally c.4-16cm long, their body, neck and head are represented by geometric shapes and anatomical details are very rarely depicted, although additional features may have been painted as shown by few specimens at Troy (Makowski 2005:10). They are mostly restricted to western Anatolia.

I.1) ***Violin-shaped*** figurines have a stalk-like head and neck, with small splayed arms and a bag-shaped body (fig.7.4a). The only reliable stratigraphic contexts are Çukuriçi Höyük IV-III (c.2900-2750 cal BC, Horejs 2013:9) and Beycesultan level XVIIb (c.2800-2700 BC, Lloyd and Mellaart 1962:269). At Beycesultan, violin-shaped figurines do not occur in later levels, and thus may provide a *terminus ante quem* for the latest specimens. Similar shapes are known in the Cyclades from Saliagos (end 5th millennium) and from a number of sites of the "Grotta-Pelos" culture, c.3200-2800 BC (fig.7.8, Stampolidis and Sotirakopoulou 2011b), and this type is thus at present the only evidence for circulation of similar figurine

[49] See however the so-called "lead figurines" treated separately in section 7.2.3.3.

shapes across the Aegean basin. In Anatolia, it is distributed essentially within the Gediz-Büyük Menderes (fig.7.5).

I.2) ***Stumpy-arms*** figurines have a disk-like head, small splayed arms and a semi-circular or bag-shaped body (fig.7.4b-c). One variant includes incised representation of hairdo on the side of the head. The most reliable contexts of Beycesultan (levels XVI-XIII), Karaoğlan Mevkii and Kaklık Mevkii (necropolis early phase) all date between c.2700 and 2500 BC (Lloyd and Mellaart 1962:260; Topbaş et al.1998). They are mainly distributed within the central part of the inland western Anatolian highlands (fig.7.5).

I.3) ***Spade-shaped*** figurines have a disk or triangular head and spade-shaped bodies (fig.7.4d). The best stratigraphic contexts are Demircihöyük-Sarıket (late phase), Kaklık Mevkii (necropolis, early phase) and Küllüoba III, covering a span between c.2600 and 2200 BC (Öner 2009:138; Seeher 2000; Topbaş et al.1998). The type is distributed across the western highlands and the western fringes of the plateau (fig.7.5).

I.4) ***Double-bodied*** figurines are composed of two disk- or spade-like elements adjoined by a long neck (fig.7.4e), and in most cases are made of local stone. The only reliable context is Karataş cemetery (period V, Mellink 1967) that dates around c.2600-2400 BC. The type is only present in south-western Anatolia (fig.7.5).

I.5) ***Eight-shaped*** figurines are very basic, but often display schematic representation of the face, either incised or painted (fig.7.4f-g). The contexts of Troy II-III, Küllüoba III and Seyitömer V (Bilgen 2011; Blegen et al.1951:211; Öner 2009:138) date this type to c.2500-2100 BC. The type has a wide distribution across western Anatolia and the western fringes of the plateau.

I.6) ***"Alabaster idol"*** figurines are composed of a round body and stalk-like neck, often with triangular head, and are probably made of gypsum or related material. Two main variants can be distinguished: I.6a are plain (fig.7.4h), while I.6b are richly decorated (fig.7.4i) and, in a few cases, display expressionistic human representations carved onto the body (fig.3.5), thus representing a connection with the expressionistic figurines of style III (see below). The only reliable context for both subtypes is represented by Kültepe levels 13-11 (Özgüç T 1963:13), dated c.2300-2000 BC. Type I.6a is common across the whole eastern part of the plateau, while I.6b is essentially restricted to Kültepe itself, with only two fragments found at Acemhöyük and Zencideresi in Cappadocia (fig.7.5).

II) ***Naturalistic style*** includes all terracotta specimens and a few metal figurines. Figurines are generally flat (but see type II.1), and normally c.6-10cm long; in most cases face, breasts, navel, buttocks and pubes are roughly depicted, while features like jewellery and clothing accessories are also sometimes represented. Naturalistic figurines are common along the north-western Anatolian seaboard, the central plateau and south-western Anatolia.

II.1) ***Bavurdu*** figurines are normally seated, have flat disk-like heads with detailed representation of facial features and generally wear a "polos", i.e. a cylindrical hat (fig.7.6a). The contexts of Demircihöyük F, Kanlıgeçit KG 3 and Küllüoba IVE (Obladen-Kauder 1996:257-278; Öner 2009:44; Karul 2012) give a date c.2800-2500 BC. The type is mainly distributed within the Afyon and Porsuk/Sakarya plains, but reaches as far as Kanlıgeçit in eastern Thrace.

II.2) ***Çaykenarı*** figurines are characterized by dense incised chevron decoration that covers the whole body (fig.7.6b); the recently excavated Hacılar Büyük Höyük provides the only stratigraphic context for this type, and suggest a date in the early 3rd millennium (Umurtak and Duru 2013:figs.43-46). They are distributed essentially within the Lakes District (fig.7.9).

II.3) ***Northern Aegean-type*** figurines generally have raised arms, pronounced breasts and with a long body where legs are often not modelled; the head has a schematic disk-like or tongue-like shape and has often no clear representation of facial features (fig.7.6c). The contexts of Poliochni Green, Thermi III-V and Yenibademli Höyük give a time span around c.2800-2500 BC (Bernabo'-Brea 1964:652; Hüriyılmaz 2002; Lamb 1936:149). The type is distributed along the western Anatolian seaboard from Gökçeada to Chios (fig.7.9).

II.4) ***Crescent-bodied*** figurines are characterized by semi-circular lower bodies (often emphasising the pubic area), a narrow torso with schematised arms, and a basic representation of facial features (fig.7.6d). They are distributed in the Ankara region and the Kızılırmak bend (fig.7.9); the contexts of Ahlatlıbel, Koçumbeli, Eti Yokuşu and Kalınkaya all date to the late EBA, c.2400-2100 BC (Kansu 1940; Koşay 1934; Tezcan 1966; Zimmermann 2007).

II.5) ***Legged*** figurines are characterized by the detailed representation of the lower body (uncommon in all other types), a narrow torso and schematic arms, with basic representation of facial features (figs.7.6e-f). While they are normally made of terracotta, three pieces from Alacahöyük “Royal” graves L and A[1] are made of copper-alloy with other metal inlays, or silver, and seem to be terracotta skeuomorphs. These graves, together with the contexts of Demircihöyük-Sarıket, Eti Yokuşu and Küllüoba, provide a chronological range between c.2800-2300 BC (Arslan et al.2013; Obladen-Kauder 1996:257-278; Öner 2009:52-57; Yalçın and Yalçın 2013). Legged figurines are distributed along the northern edges of the central plateau and within the Kızılırmak bend (fig.9).

III) ***Expressionistic style*** figurines are always three-dimensional (c.8-25cm in height), are made for standing in upright position and their anatomical details are accurately depicted in a clear attempt to replicate human features, although often exaggerated (e.g. the slenderness of Hasanoğlan's piece, fig.7.7a, or the buttocks of Kültepe's seated examples, figs.7.7e-i). Their manufacturing medium (metal or "alabaster") and the care in their execution suggests in all cases the product of a specialised workshop.

III.1) ***Metal figurines*** are distributed within the Kızılırmak bend (fig.7.9) and have only been found in funerary contexts at Hasanoğlan, Alacahöyük grave H and Horoztepe (figs.7a-d, Bilgi 2012; Özgüç T and Akok 1958; Yalçın and Yalçın 2013), that do not provide an accurate date[50] but can be placed after c.2500 BC.

III.2) ***"Alabaster" figurines*** depict naked female figures seated on a stool/throne, and are only found in Kültepe level 11, c. 2100-2000 BC (figs.7.7e-i, Özgüç N 1957).

While their function has rarely been discussed, these objects are mostly interpreted as depictions of a "Mother Goddess" of sort. However, when body features are depicted with enough detail, many EBA figurines show individuals with hands joined to the chest, folded on the abdomen or raised in the air (figs. 7.7a, c, e; also Bilgi 2012:figs.864-873), and are thus probably depicting worshippers rather than divinities (cf. Makowski 2005:27-29). Comparison with later MBA examples seems also enlightening, since in this period many figurines depict a range of distinct male and female deities that can be clearly recognised by peculiar attributes (Bilgi 2012:344-385), something not detectable in the EBA pieces.

7.1.1.3 Contexts of production and deposition

EBA terracotta and stone figurines are found across the whole study area and in most sites, and are generally retrieved in domestic contexts, e.g. in Demircihöyük where almost every room yielded some pieces (Obladen-Kauder 1996:257), and in funerary assemblages, e.g. in Karahisar (Yayalı and Akdeniz 2002), Harmanören (Özsait 2003), Yortan (Kamil 1982) and Balıbağı (Süel 1992). When results from osteological analysis are available, they are normally associated with child burials, e.g. in Karataş (Mellink 1967:254) and Demircihöyük-Sarıket (Seeher 2000:64-65). Figurines are generally not found in public secular buildings, e.g. not within Troy and Kanlıgeçit monumental megara, so far the best documented elite structures in west-central Anatolia. A possible connection with ritual activities is however represented by the marble pieces found together with four miniature daggers in Beycesultan XVIIb "shrine" (Lloyd and Mellaart 1962:33) and a single marble example deposited in the Malkaya cave, part of a large

[50] Alacahöyük grave H did not yield samples for radiocarbon analysis.

prehistoric "sanctuary" complex on Mount Latmos (Peschlow-Bindokat 2007). Nonetheless, a more mundane function (e.g. toys) should not be excluded at least for the cruder terracotta figurines. In the eastern portion of the plateau, on the other hand, a particular group of figurines (types I.6b, III.1 and III.2) is only found in elite contexts, e.g. in Kültepe level 11 "Palace" and graves (Özgüç T 1963:14), and in the Horoztepe and Alacahöyük "Royal" graves (Koşay 1951; Özgüç T and Akok 1958). Perhaps not incidentally, this group is composed exclusively of metal and "alabaster"/gypsum pieces that display a much more sophisticated manufacturing process.

The range of materials, retrieval contexts and effort put in their manufacture thus suggests that we are dealing with artefacts produced for different purposes; also, at least for the "alabaster" and metal figurines a different (elite?) audience is probable. In the vast majority of cases, terracotta figurines were crudely made, and did not require particular skills. The easy procurement of clay and the pronounced variability of their features even within the same type and at the same site further suggest that they were manufactured within individual households. While EBA pieces have not been subjected to detailed study, fingerprints analysis on Neolithic figurines from Boncuklu and Çatalhöyük shows that they were mainly produced by women and children (Baird 2014). On the other side, marble figurines probably required a more substantial time and energy investment, and their manufacture likely occurred near the quarries, since there is at present no evidence for marble manufacture within the excavated settlements. A different scenario has to be envisaged for a group of "alabaster"/gypsum figurines found in Cappadocia and the Kızılırmak bend (types I.6b and III.2), that required considerable skills for their manufacture and seem the result of specialised artisanship. Their stylistic homogeneity, their concentration at Kültepe (47 out of 57, c.82%) and the retrieval of unfinished pieces at Kültepe itself (e.g. fig.7.7h) suggest that they were probably produced by one or more local workshops within the site. The complexity of type III.1 metal figurines, manufactured with a combination of sophisticated techniques including lost-wax, inlay (either in silver/gold or perishable materials) and metal plating (e.g. figs.7.7a-c), hints at the existence of specialised smiths. Indeed, these figurines represent but a minute proportion of the several thousand well-crafted EBA metal artefacts found at Alacahöyük's "Royal Cemetery" and other sites within the Kızılırmak bend. This suggests that, while settlement levels contemporary with the "Royal Cemetery" are only scantily investigated and thus direct evidence is lacking, Alacahöyük did most likely harbour one or more of such metal workshops.

7.1.1.4 Circulation

A severe limitation in understanding the exchange of these figurines is represented by the almost total lack of data for large portions of west and central Anatolia, particularly the southern part of the central plateau and most of the uplands (fig.7.2). What seems clear, however, is that Anatolian figurines share little in common with those of neighbouring areas (cf. Stampolidis and Sotirakopoulou 2011b for the Aegean; Sakal 2013 for the Euphrates area). There are few exceptions, mainly confined within the Büyük Menderes-Gediz triangle, an area that once again records intense contacts with the western Aegean, likely through the "Cycladic corridor" (fig.7.10). These are represented for instance by the already-mentioned similarity between the violin-shaped marble figurines (type I.1) and the "Grotta-Pelos" type (fig.7.8d-f). Furthermore, a few Cycladic Folded-Arm figurines seem to have found their way to the Anatolian coast, as shown by the Dokathismata-type figurine fragment found at Milet (fig.7.8b, von Graeve 1999:586, fig.11). Although not documented in detail, many Cycladic marble figurines (in particular, one "*seated in a chair playing a harp*", the other "*a female figurine with a crescent on her head*") were also found among the grave goods of stone cist graves at Kap Krio, near Knidos (Bent 1888:82). Intriguingly, a terracotta fragment from Çine-Tepecik (Günel 2014:fig.8) also hints at a familiarity with the Dokathismata-type figurines, but is a clear local adaptation of the type (fig.7.8c).

On the other hand, the Afyon, Porsuk and Sakarya plains emerge as an interface zone between east and west, for the co-occurrence of western Anatolian (I.2, I.3, I.5) and central Anatolian (II.5) figurine types. Overall, the distribution of the Anatolian figurine types and their manufacturing materials indicates that, while there is significant overlapping between them and different types co-exist at the same site (often in the same level), it broadly defines several topographically-homogeneous regions (fig.7.10):

a) the ***eastern Aegean seaboard***: type II.3;

b) the ***Afyon region***: types I.2, II.1, predominance of marble products;

c) the ***Büyük Menderes-Gediz triangle***: type I.1, presence of Aegean/"Aegeanizing" types, predominance of marble figurines;

d) ***south-western Anatolia***: types I.4, II.2, significant proportions of local stone and terracotta products;

e) ***Cappadocia***: types I.6b, III.2, dominance of "alabaster"/gypsum figurines;

f) the ***Kızılırmak bend and Ankara region***: types I.6a, II.4, II.5, III.1, dominance of terracotta products.

The boundaries of these areas, as represented on the map, suggest permeable interfaces (section 2.1.2.2), rather than sharp borders. The fact that most neighbouring regions are not well-defined (because of scarcity of archaeological data) further urges caution in drawing the extent of each of these regions. This notwithstanding, the observed spatial patterning is corroborated by very similar results with a number of other artefact classes treated below.

The figurines' contexts of production and manufacturing materials also hint at different ways in which they circulated. Terracotta figurines were in most cases probably produced in the same settlement where they were found, indicating that their shapes were probably locally replicated through acquaintance with existing artefacts, rather than being exchanged over large distances, as also suggested by the much larger variability of the shapes. On the other hand, the more valuable metal and stone figurines were in all likelihood produced in a limited number of workshops, suggesting the actual exchange of finished products along with the local replication of shapes.

7.1.2 Loomweights

It can be argued that textiles, particularly in the form of garments, may have played during the EBA (as they still do today) an important role in the construction and advertisement of the personal identity of an individual, their social position within a community, and their affiliation to particular groups (Bachhuber 2015:61; Bevan 2010; Richmond 2006:203-204; Wilkinson 2014b:257-260). Despite the fact that they are mostly invisible in the archaeological record, both raw materials (wool, flax) and finished products (woven cloth, garments, tapestry) would have in all likelihood composed a large share of the products exchanged in EBA Anatolia. The occurrence of sophisticated garments in the area (see below) is an additional hint that certain textiles might have been indeed a valuable item of exchange (cf. Bachhuber 2015:137-139). Textual evidence from late 3rd millennium Mesopotamia (e.g. Ur III and Ebla's archives) and from MBA Anatolia highlights not only the importance of textiles in the exchange networks, but also the complex organisation behind production and circulation of these items, and the range of different product qualities that were traded (Bevan 2010; Lassen 2014; Wilkinson 2014b:227-235).

While preserved textiles are exceedingly scarce in prehistoric Anatolia (Schoop 2014:425-426), and thus we cannot directly understand how textile technological knowledge may have circulated, the much better preservation of tools can provide useful hints on this issue. In EBA Anatolia, evidence for textile industry is ubiquitous in most excavated sites, where spindle whorls and loomweights in particular represent a large proportion of all small finds. However, given the scarce analytical attention generally paid to these objects, it is often difficult to understand the contexts in which this activity took place. Although all the different stages of the *chaîne opératoire* (wool-shearing/flax-processing, carding, spinning, weaving and dyeing) are quite labour-intensive, weaving is arguably the task that required more specialised skills and that is more extensively documented in the available archaeological evidence (Bachhuber 2015:61, 71; Richmond 2006:214). For this reason, the following analysis focuses on c.1,200 clay/terracotta loomweights recorded at 29 sites across Anatolia (figs.7.11-7.13) and includes, in addition to all accessible EBA evidence, also better-documented MBA contexts that provide a means of comparison and contrast with earlier situations. Through loomweights typology, spatial distribution analysis and investigation of their retrieval contexts, two main issues will be here explored: the degree of specialisation behind textile production and the circulation of textile-related technological knowledge in EBA Anatolia, and possible changes therein during the early 2nd millennium.

7.1.2.1 Typology

Only a limited number of loomweight specimens have so far been characterised in terms of their manufacture, typology and weight (notably at Demircihöyük, Obladen-Kauder 1996:237-244), while most pieces are instead mentioned in publications without contextual information or detailed drawings, thus allowing only for a broad classification. Although EBA Anatolian loomweights were in most cases crudely shaped, often unbaked and with relatively low standardisation even within a single site, several different types can be identified:

I) ***Drop-shaped weights*** are already present in Anatolia since the mid-5th millennium (Schoop 2014:431), and remain the main type into the EBA, with a few pieces still being produced in the early 2nd millennium. While they are overall characterized by high variability, two main sub-types can be recognised, with either round (a) or flat (b) bottom (figs.7.14.1-4).

II) ***Tronco-pyramidal weights*** first appear at Hacılar Büyük Höyük phase İTÇ I/1 (c.3050-2900 cal BC, Umurtak and Duru 2013) and Demircihöyük phase E (c.2850-2800 cal BC, Obladen-Kauder 1996:fig.169) and continue into the 2nd millennium (figs.7.14.5-8). With the exclusion of a single piece from Thermi, during the EBA they seem restricted to the western Anatolian highlands (fig.7.16), where often they represent the majority of the assemblage (e.g. at Karataş and Demircihöyük). In several cases they are marked with crosses on the top surface, notably already in the early context of Demircihöyük where incised pieces represent c.12% of the total (Obladen-Kauder 1996:239).

III) ***Discoid weights*** are also a type that appears during the EBA (figs.7.14.9-12), with the earliest dateable pieces found at Thermi level III (c.2800-2700 BC, Lamb 1936:163). Excluding a single example from Aphrodisias, they all come from sites along the Aegean coast (fig.7.16). While this type of weights is normally considered peculiar of Crete and their presence in MBA Anatolian contexts has been hailed as evidence for technological transfer from the south-western Aegean to the east[51] (cf. Burke 1998:25; Cheval 2011; Pavuk 2012), their occurrence in coastal Anatolia in a horizon contemporary with (if not earlier than) Myrtos-Fourni Korifi EM IIb pieces (Burke 1998:37-38) suggests that this might not be the case. Regardless of the origin of the type, the Anatolian discoid weights further confirm the high degree of interaction between eastern and southern Aegean already in the early-mid 3rd millennium.

IV) ***Bag-shaped weights*** are already present in small quantities at late 4th millennium İkiztepe (Alkım et al.1988), and during the EBA sporadically appear at several sites in northern Anatolia where they always constitute a small minority of the dataset (figs.7.14.13-15). The only exception is the eastern Thracian site of Kanlıgeçit (level KG 3, c.2700-2500 cal BC), where they represented the only type on site (Özdoğan and Yılmaz 2012:194-195). Although direct parallels with sites in the northern Pontic area are not available, their spatial distribution suggests a possible connection with the northern Circumpontic area (fig.7.16).

V) ***Trapezoid weights*** (figs.7.14.16-19, in some cases pierced by two holes) are restricted to western Anatolia and the western fringes of the central plateau, and are generally represented by few pieces at each site, with the exception of EBA Troy where they compose the vast majority of the assemblage (fig.7.16). A few trapezoid weights are decorated with simple incisions, mostly in shape of crosses (e.g. fig.7.14.17).

VI) ***Crescent-shaped weights*** are at present the first and only EBA loomweights that are consistently produced with two suspension holes (one at each extremity), an element that suggests a significant technological innovation (see below). Three main sub-types can be identified: the first (VIa) is characterised by a kidney-shaped sturdy and thick body, rectangular/trapezoidal in section, and is currently limited to c.2700-2200 BC contexts (figs.7.15.1-5). Sub-type VIb is more slender, with a round section, and is present in both EBA (starting at c.2800-2700 BC) and MBA contexts (figs.7.15.6-12). Examples from sub-type VIc are characterised by a thinner appearance and a rectangular section, and are at present only found in MBA contexts (figs.7.15.13-15).

The chrono-spatial distribution of the type (fig.7.17) indicates that it probably originated near the Marmara Sea, since the earliest examples come from Hacılartepe III.5 (Eimermann 2008:387, figs.24.11-12) and Demircihhöyük E_1 (Obladen-Kauder 1996:353), both radiocarbon-dated to c.2850-2700 cal BC. Until the latest EBA, the crescent-shaped weights remain confined to north-western Anatolia and the Sakarya-Porsuk plains, where they always represent a minute proportion of the assemblages (at Hacılartepe, Demircihhöyük, Küllüoba, Troy and Thermi). At the end of the 3rd millennium, they seem to quickly spread towards the Büyük Menderes-Gediz

[51] To note however that many of the MBA "Minoan" discoid weights are often characterized by a rut on the top surface of the object, which is absent in all EBA Anatolian pieces.

triangle and towards Rough Cilicia (through the Konya plain?). Within this horizon, a few crescent-shaped loomweights are also found in mainland Greece, at Lerna EH IIb and Tiryns EH III (Siennicka 2012:70, pl.XXVh), a further confirmation of the importance of the "Büyük Menderes-Cyclades corridor" for interaction between the two shores of the Aegean. By the early 2nd millennium, crescent-shaped sub-types VIb and VIc represent the vast majority of loomweights at all sites in central Anatolia and along the Büyük Menderes-Gediz triangle, where they replace previous forms almost radically; they are absent only along the eastern Aegean seaboard.

In contemporary with their diffusion across the area and their increase in popularity, most of the latest EBA and MBA pieces show signs of being marked in one way or another, through incised decorations, simple seal impressions or impression of other small objects (e.g. pins), something that will be discussed in more detail below (figs.7.13.20-27). While early analyses on MBA specimens suggested that they were not loomweights but administrative tokens (Vogelsang-Eastwood 1990; Weingarten 1990), Agnete Lassen has conclusively identified them as loomweights through experimental analysis (2013). The presence of the same artefact types at small, early EBA sites with no evidence for centralised administration (e.g. Demircihöyük and Hacılartepe) further corroborates Lassen's hypothesis that they should not interpreted as administrative tools *per se* (but see below).

Across EBA west-central Anatolia there are several documented loomweight caches that likely represent partial or complete loom sets and, with the single exception of the Demircihöyük example, they are all composed of one weight type (fig.7.11), while the only *in situ* loom comes from Troy IIg, and also has single-type weights. This evidence indicates that loom sets were generally composed of weights of the same type. On the other hand, several types often co-exist at the same site, even within the same level. In addition to possibly representing contemporary but different traditions of loomweight manufacture, this might indicate the production of different kinds of textile product. Experimental analysis on modern replicas of ancient weaving toolssuggests that the manufacture of different textiles would have entailed the use of weights with different mass and different shapes, according to the thickness of the yarn, the density of threads per cm^2 and the weaving pattern (Andersson Strand and Nosch 2015; Cutler et al.2013; Frangipane et al.2009; Lassen 2015). This hints at possible functional differences between the documented types, and potentially also at the production of textiles of different quality (cf. Lassen 2013; Martensson et al.2009). While very few detailed analysis has been carried out on textile implements in the study area, this hypothesis is confirmed by functional studies of spindle whorls and weights at EBA Çukuriçi Höyük (Britsch and Horejs 2014), at LCh-MBA Arslantepe on the Upper Euphrates (Frangipane et al.2009) and at MBA Kültepe (Lassen 2013).

7.1.2.2 Craft specialisation

Employing the framework described in section 2.3.2, the degree of organisational complexity in textile manufacture can be analysed via four parameters: the social contexft in which it occurs, the level of spatial concentration in textile activity, the number of individuals involved in the production, and the amount of time spent on the production. In particular, the presence of co-occurring activities (e.g. cooking, knapping, metallurgy etc.) or different stages of textile production (carding, spinning, weaving, decoration) within the same room/building would suggest lower levels of craft specialisation. On the other hand, the separation of different stages of textile manufacture in different places (and/or performed by different people), the presence of several textile artisans in a single room/building and the connection between textile manufacture with centralised administration would suggest higher levels of specialisation.

Datasets coming from better-published EBA sites indicate a range of possible manufacturing contexts: for instance, at the small site of Demircihöyük (0.3ha) carding, spinning and weaving are attested in most domestic assemblages, often together in the same room, and are normally associated with a number of other primary activities (sections 4.1.1, 4.1.3). This suggests that, in this case, textile production was household-based, with low levels of specialisation and possibly intended to satisfy only the needs of individual families (cf. Bachuber 2015:69-71). At the larger site of Karataş, textile implements are also found in most individual households, where they are always associated with other activities (section 4.2.2) and thence show a pattern of production similar to that of Demircihöyük. However, significant amounts of spindle whorls, clay brushes (for carding), loomweights and clay stamps (for decoration) were also found in the burnt debris of the Central Complex phase II, a probable elite building (Mellink 1965:249; 1966:249; 1967:264). Although the latter context is still largely unpublished, these finds might reflect a different social milieu for textile manufacture, and potentially one producing higher-quality products.

On the other hand, the c.8,000 spindle whorls found in Troy II-III contexts clearly hint at an enterprise far beyond the needs of the local community. Intriguingly, at Troy, it is worth noting also the retrieval of c.100 loomweights from the monumental megaron IIA, suggestive of a close connection between the local textile industry and the elite sphere (Bachhuber 2015:61, 149). Furthermore, the burnt context of room 206 (within the level IIg “citadel”) yielded an *in situ* loom set, with two post-holes likely representing the remains of a wooden structure, 44 clay weights in several parallel lines, 189 gold beads strewn in the soil above the weights, 20 clay spindle whorls, three bone awls and one clay brush (Blegen et al.1950:350-353). The remaining room assemblage points to a wealthy multi-purpose space, and consists of other metal items (gold wire, copper-based pins), a mortar and several grinders (for dye?), some animal bones, and a vast amount of clay pots (ranging from drinking and eating, to pouring, to imported storage vessels); no hearth was identified, though the room was only partially excavated. The golden beads (most probably sewn into a cloth) evoke the existence of valuable garments that were likely produced for an elite audience, and similar artefacts have also been retrieved at sites within the Kızılırmak bend, where hundreds of gold and silver appliqués were also found within rich grave assemblages (Bachhuber 2015:175). Although it is tempting to indicate room 206 as a specialised workshop under elite patronage, the evidence is not compelling. In fact, across EBA excavated settlements there is at present no compelling evidence for rooms/areas entirely dedicated to textile manufacture that might suggest highly specialised workshops. This for instance contrasts with better-known MBA Anatolian contexts, where weaving activities are in some cases outsourced to smaller settlements and/or subjected to significant administrative control (e.g. at Kültepe and Konya-Karahöyük, Lassen 2013, 2014).

Concerning this issue, a further strand of evidence might be provided by the marks found on loomweights. During most of the EBA, they are only sporadically decorated with simple incisions such as crosses (figs.7.11-12), and these signs mostly occur on pyramidal weights (type II), while there are at present not recorded on types I, III, IV, VI, and only a few examples for type V. Between c.2100 and 1800 BC, there is a noticeable increase not only in the proportion of marked loomweights, but also in the complexity of these marks, a phenomenon that seems to involve only crescent-shaped pieces (sub-types VIb and VIc). This change is first visible at Kilisetepe IVb (c.2100-1950 BC), where simple seal impressions are recorded on all weights (Collon and Symington 2007), and then at Demircihöyük levels IV-II (MBA), where 23 of the 74 loomweights (31%) are marked with incised decorations and, in one case, a pin-head impression (Kull 1988:200-201, figs.192-195). The best-documented context remains Konya-Karahöyük, a large MBA centre (50ha+ in size), where 310 crescent-shaped loomweights are recorded. The majority (c.90%) are either seal-stamped (175) or marked with various incised patterns or with impressed objects (104), and only 32 are blank (Weingarten 1990:65). Weingarten’s analysis of the Konya-Karahöyük assemblage showed that:

a) although found across the excavated area, the crescent-shaped weights are mostly concentrated in three rooms with no evidence for sealing archival practices;

b) with only two exceptions, all seals represented on these items (156 pieces) marked a single artefact, and show no signs of belonging to a hierarchical system of access to stored goods;

c) seal motifs on the crescent-shaped weights in no case matched motifs on archived sealings and were much simpler than those belonging to proper administrative seals (1990:66-69).

Weingarten suggested that the crescent-shaped objects might have been employed as administrative tokens documenting single transactions between the palace and a large number of external individuals (1990:73-75). The identification of these artefacts as loomweights has allowed Lassen to further hypothesise a system that recorded transactions between palatial officials and weavers outside direct centralised control. These artisans would have used simple geometric seals, incised decorations or impressions of small objects on their working tools for personal identification, as a signature (2013). While there are at present no available data regarding the primary contexts of use for MBA loomweights, and thus we have no direct evidence for the spatial organisation of the areas in which they were employed, it can be argued that the desire to personalise and distinguish one's tools would stem from a situation where there are people working with similar instruments in close contact with each other. This would likely be a textile workshop or at least a working environment focused on textile production. If this interpretation were correct, it would place the context of Konya-Karahöyük as the earliest direct evidence for highly-specialised textile production in Bronze Age Anatolia.

7.1.2.3 Circulation of technological know-how

The spatial distribution of different EBA loomweight shapes (fig.7.16) shows a clear regional patterning, that incidentally seem to confirm the trends already observed for the EBA figurines:

a) type I (drop-shaped), despite being present at most sites, is predominant only in central Anatolia and the Büyük Menderes-Gediz triangle;

b) type II (pyramidal) and V (trapezoid) are confined to ***western Anatolia***;

b) type III (discoid) is essentially restricted to the ***eastern Aegean seaboard***;

c) type IV (bag-shaped) is only present in ***northern Anatolia*** and along the ***Black Sea coast***.

As with the figurines, noteworthy is the role of the Afyon, Porsuk and Sakarya plains as interface zone, where loomweight shapes typical of western Anatolia (II, V), Black Sea (IV) and central Anatolia (I) co-exist at the same site. While the small number of well-dated contexts limits the possibility of detailed analysis, it seems that the spatial distribution of the abovementioned types remains quite stable across the whole EBA, and in some cases persists into the 2nd millennium (cf. the distribution of –grooved- discoid weights exclusively along the eastern Aegean coast, Pavuk 2012:pl.XXXIVb). The *longue durée* of several types is also worthy of notice: drop-shaped (already present in the Chalcolithic), discoid and pyramidal weights occur at MBA sites in varying proportions (fig.7.12).

Given their low manufacturing quality (crude and non-standardised shapes, often unbaked) and the ease of production, it can be argued that loomweights were in most cases made by individual weavers at the same place where they have been found. In all likelihood, the observed spatial patterning thus reflects the circulation of technical skill sets (e.g. regarding production of weights for a specific loom set, and creation of different patterns and different weaves), rather than their actual exchange at the regional level (cf. Cutler 2014 for a similar hypothesis on Cretan weights).

How would have technological know-how been transferred? Although contextual information is generally scarce, most EBA findspots are clearly domestic in nature (fig.7.11), and textile industry is often connected with other activities, suggesting that weaving may have been a part-time occupation performed by one or more members of the household. Looms would also have needed to be set inside the house to prevent exposure to weather and could have been operated by a limited number of individuals (one/two?), suggesting that weaving might have entailed a lower degree of communality than other daily chores. This might indicate that the circulation of textile-related knowledge would have been more limited than for other technologies, and may have been transferred mainly from parent to child ("vertical transmission"), although interaction with other peers, such as neighbours, travellers or partners in exogamic marriages ("horizontal transmission") may have been a secondary mode of technological exchange (cf. Boyd and Richerson 1985 for the concepts). Vertical transmission, generally characterised by slower rates of diffusion and a higher conservativism (cf. Gosselain 2000 in the context of household-produced pottery) would also in part explain the *longue durée* of many loomweight types and the stability in their spatial distribution across time.

In this regard, the case of the crescent-shaped type is potentially interesting because it provides some hints for a rather different mechanism of skills transfer. Lassen argues that the production of weights with two suspension holes represent a significant technological innovation, thanks to which a loom would require fewer weights, would be easier and more flexible to use, and would be able to produce different patterns with the same weights set (2013). Despite the strength of this innovation, for most of the EBA type VI weights remain confined to a small number of sites, where they represent in general a minority of the assemblages, a situation that agrees with the abovementioned patterns of vertical transmission. However, between c.2100-1800 BC they witness a seemingly rapid diffusion across west and central Anatolia, in most cases replacing previous types almost radically. Contemporary with this spread, many of the crescent-shaped weights start to be marked with more complex signs (a hint for their employment in specialised workshops), and this horizon probably coincides with a further innovation: their shape becomes thinner, more slender and with more standardised weight, making them very suitable for the production of twill, a valued quality of textile (Lassen 2013). In this light, their rapid diffusion after c.2100 BC can thus be explained by a shift of their socio-economic context of use, from households and non-specialists to workshops and craftspeople. Specialised workshops (especially if in contact with palace economies as in the case of Konya-Karahöyük) would have likely promoted formalised apprenticeship ("oblique transmission"), and favoured the circulation of weavers (e.g. exchange of craftspeople), promoting much higher rates of diffusion of the innovation.

7.1.3 Pottery manufacture

Traditionally, one of the main areas of investigation in EBA Anatolian archaeology has been the definition of so-called "pottery groups" (regional networks of finished pottery products and pottery-manufacturing techniques) based on spatial patterning in particular wares and ceramic types (cf. Efe 1988, 2006a; Efe and Türkteki 2011; French 1969; Mellaart 1954; Orthmann 1963a). In this context, Deniz Sarı's research, based on extensive examination of large amounts of pottery assemblages from both excavated and surveyed sites across western Anatolia, is particularly innovative (2011; 2013). In addition to a detailed chrono-typology of individual ceramic types, wares, decorations and surface treatments, she systematised the management and display of her results via a GIS, and combined ceramic evidence with the spatial analysis of anthropomorphic figurines, metal artefacts and architectural features. Furthermore, she bridged for the first time EBA and MBA pottery studies, and attempted to integrate archaeological and textual evidence for the 2nd millennium. Also, she explicitly included the analysis of topographic features to discuss the spatial distribution of particular "pottery groups", correlating orographic and hydrographic barriers to movement with what she calls "*frontierès culturelles*" (Sarı 2011:18). This large analytical dataset thus provides the most up to date and detailed understanding of the main pottery exchange networks between the latest 4th and mid-2nd millennia.

Within the framework of this dissertation, the main problem in employing her results is that she did not map the distribution of individual pottery types, wares, surface treatments, decorations or other peculiar elements, but instead provided an aggregated assessment of individual site assemblages, assigning each site as a whole to either one "pottery group" or another. As such, her analyses tend to emphasise internal homogeneity within a region rather than contacts between different areas, for instance concerning circulation of finished products or manufacturing technologies. Furthermore, her work tends to present the interface between different regional pottery networks as sharp rather than permeable. This notwithstanding, her results provide the best chance to compare an important artefact class (pottery) that would not otherwise be included here, and will thus be briefly discussed.

Sarı divided her ceramic dataset in four distinct chronological phases that follow the traditional relative chronological periodisation (section 1.4): "EB I" (c.3200-2800 BC), "EB II" (c.2800-2400 BC), "EB III" (c.2400-2000 BC) and "MBA" (c.2000-1650 BC). For each phase, she identified between seven and 19 "pottery groups" (figs.7.18-7.21), collectively brought together within six “cultural regions”, i.e. larger entities that share internal cultural similarity not only concerning pottery but also other elements such as architecture and figurine-manufacturing traditions (fig.7.22).[52] Despite some changes that are partly related with the quality and density of the datasets in each period, her results highlight several important trends: for instance, the extent of the different “pottery groups” and “cultural regions” seems to remain relatively stable throughout the period under analysis (c.1500 years), and their boundaries seem to reflect major topographic features (Sarı 2011:244-256). Furthermore, the Büyük Menderes valley emerges as the main natural corridor between western and central Anatolia, as witnessed by the local occurrence of pottery wares, decorations and types that have clear parallels with ceramic assemblages from sites in the eastern Aegean and the Porsuk-Sakarya plains (Sarı 2011:46-47, 129-136, 183-185). Additionally, her six “cultural regions” can be also discerned in the spatial distribution of the figurine types (section 7.1.1), and to a lesser extent that of loomweight types (section 7.1.2).

Following previous suggestions (e.g. Efe 2002, 2003), Sarı equates her “pottery groups” with the extent of small EBA “city-states” or “kingdoms”, whose earliest appearance she dates to c.2600-2400 BC (2011:151-152; 2013). While I have also argued a similar date for the formation of the earliest territorial polities in Anatolia (section 1.5.2), their identification with the “pottery groups” (or other areas emerging for my analyses) is rather problematic. Two lines of reasoning can be brought forward: the first follows the well-known “pots are not people” stance of processual and post-processual archaeology, which argues that pottery typologies and spatial distributions cannot be conceived –alone- as reliable indices of social, political, linguistic or ethnic identity (cf. Clarke 1968; Jones 1997; Hodder 1991, also Croucher and Wynnies-Jones 2006; Cruz 2011 for discussing it in the context of 19th-20th centuries AD west Africa).

The second line of thought instead revolves around the suggestion that EBA territorial polities could not have existed in the form that Efe and Sarı imagined. For instance, these groups are already quite well-defined during the late 4th millennium (a period for which there is little archaeological evidence of complex societies at the intra- and inter-site level), and remain relatively stable across 1500 years. It is hardly conceivable that political entities would survive unscathed for such a long time, particularly because there is extensive textual evidence for the extreme fragility of competing central Anatolian MBA city-states, that often lasted only a few generations (Barjamovic et al.2012:44-49; Palmisano 2015:222), a situation that matches archaeological evidence for numerous episodes of warfare in late EBA Anatolia (cf. Massa 2014a; Massa and Şahoğlu 2015). In this light, it is unlikely that these early political formations would have had such a clear impact on material culture.

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[52] These maps are based on Deniz Sarı’s own digital datasets; I wish to thank her for sharing them with me.

Also, there is at present no evidence for centralised pottery manufacture (located within the "city-state" capitals) that would more convincingly explain the distribution of ceramic products within a confined area. Furthermore Renfrew, in a review of early states that included Early Dynastic Mesopotamia, Mycenaean Greece, Classical Greece, Etruria and Maya, argued that the first political entities in each region would have had control over an area c.1,000-2,000km^2 in size, with an average distance between their capitals ranging from c.30 to 70km, i.e. one or two days' walk (1975:12-21, figs.2-5). A recent modelling of regional hierarchical structuring in MBA Crete seems to confirm Renfrew's early hypothesis, with the recognition of eight main palatial centres across an area of c.8,500km^2 (Bevan and Wilson 2013). In contrast, Sarı's "EB III pottery groups" span between 2,000 and 25,000km^2, i.e. two to ten times bigger that Renfrew's proposed upper size limit for early states.

An important methodological observation also emerges when analysing Sarı's results: it seems clear that larger numbers of well-excavated and well-published stratigraphic sequences during the "EB II" allowed for the identification of many more survey sites attributable to this phase than other phases (fig.7.23b), which in turn allowed for the recognition of more "pottery groups" within the same time span (fig.7.23c). The spatial extent of the "EB II pottery groups" is on average much smaller than in other phases simply because there are more data available, and differences between sites can be more clearly detected (fig.7.23d-e). It thus seems evident that the ability to recognise similarity/diversity in any archaeological assemblage is also strongly connected with the density, quantity and quality of the archaeological evidence itself, in addition to real archaeological patterns.

7.1.4 Additional evidence: burial customs

Although the main focus of this chapter is the circulation of finished products, a brief excursus on funerary practices seems useful in order to provide additional analytical weight to the reconstruction of regional interaction networks in EBA Anatolia. The investigation of EBA burial customs has been the topic of my BA and MSc dissertations and of several publications (Massa 2007, 2008, 2014b; Massa and Şahoğlu 2011, in prep.), and this research will be here summarised and contextualised. To start, it is worth stressing that there are a number of funerary traits shared across both western and central Anatolia, and often even beyond this area (e.g. the Aegean basin). These include: a) interment in foetal position, laid on one side, b) more or less standardised funerary good assemblages (including pottery vessels, personal ornaments and weapons), c) differential treatment of unborn, stillborn and babies (below 1 year), always interred under house floors, and d) particular attention to small children, in some cases buried with rich assemblages composed of jewellery and figurines (Massa and Şahoğlu 2011:165-166).

On the other hand, throughout the EBA there is a noticeable trend towards the formalisation of funerary behaviours both at the site level (with limited intra-site variability of practices) and at the regional scale (with large areas sharing common customs, Massa and Şahoğlu in press). The major breakwater seems represented by the presence or absence of formal cemeteries: across western and northern Anatolia, extramural burial grounds are the normative practice, while intramural interment of adults and children prevails in the Konya plain, Cappadocia and southern Kızılırmak bend (fig.7.24, Massa 2014b:88). Another major difference is represented by the form of grave containers (fig.7.24): in the western Anatolian highlands, large "family pithoi" (up to 2-2.5m in height) are the exclusive form employed, while central Anatolian burials are instead characterised by the contemporary co-existence of different grave containers: jars, stone cists, simple pits (probably containing a wooden coffin) and stone-lined pits (possibly completed with a wooden frame). Intriguingly, cemeteries composed exclusively of "family pithoi" and cemeteries with a combination of different burial containers do co-exist in the Büyük Menderes-Gediz triangle, witnessing the role of these valleys as major natural routes between western Anatolia and the central plateau. A number of sites on the Aegean coast reveal the use of rock-cut graves or cist-only cemeteries, a clear hint of strong interaction with western Aegean communities (Massa and and Şahoğlu 2011:169).

Furthermore, single interments are the most common practice across the whole central Anatolia, while multiple interments (normally 2-3 but up to 6-8) are typical of western Anatolian burials (fig.7.25). Additionally, together with the diffusion of "family pithoi", the east/south-east orientation of the deceased's head becomes the normative position across the whole western Anatolian highlands, while no regular orientation has so far been observed at burial grounds in central Anatolia or along the eastern Aegean seaboard (fig.7.25, Massa and Şahoğlu in press).

While none of the cemeteries related to the major western Anatolian centres has been excavated to date, and thus it is difficult to assess elite funerary behaviours in this region, this might be a further point of differentiation. In a large area between the Afyon, Porsuk and Sakarya plains and the Kızılırmak bend, graves of important members of the community seem to have been characterised by a shared set of elements, including the interment in large stone cists or chamber tombs, the associated burial of cattle (either the whole carcass, or hide-and-hoofs), the placement of knobbed maces/sceptres and, in some cases, metal standards and sistra (fig.7.26). In south-western Anatolia, elite graves are instead marked by human remains in secondary deposition (possibly exposed and buried once disarticulation had already taken place) under a small tumulus, within cemeteries that are otherwise characterised by primary depositions in "family pithoi" (Massa 2014b:86-89).

A final element that defines regional funerary traditions is represented by the practice of "ritual killing" of some categories of grave goods during the late 3rd millennium, a practice not previously documented in Anatolia but common in south-eastern Europe since the early 4th millennium (Chapman 2000; Chapman and Gaydarska 2007), thus possibly broadly correlated. Within the Kızılırmak bend, metal daggers, pins and vessels have been found intentionally bent, crushed or flattened (Zimmermann 2010b). At Karataş (in south-western Anatolia), most of the marble figurines have their heads knocked off, while within the Büyük Menderes basin intentional fragmentation of ceramic vessels is observed (fig.7.27, Massa and Şahoğlu in prep.).

Although the density and quality of the archaeological datasets constrains our ability to better define certain areas and limits our understanding of the flows of interaction between one region and another, the elements discussed above allow to draw several regional traditions characterised by distinct combinations of funerary traits (fig.7.28). Again, their distribution seems to strengthen the spatial patterns observed earlier for figurines, pottery and (to a lesser extent) loomweights. In particular, it highlights the strong contacts between the western Anatolian coast and the Aegean world, witnessed by the grave container shapes (rock-cut tombs, cist-only cemeteries), the absence of standardised head orientation and the possibly the practice of ceramic vessel fragmentation (a trait also observed in the Cyclades, cf. Stampolidis and Sotirakopoulou 2011a:95). Furthermore, the Büyük Menderes-Gediz triangle again recurs as a major interface zone between east and west, with different sites[53] having either "family pithoi" and multiple interment practices (typical of western Anatolia) or a mix of jars, cists, and pits and single burials (typical of central Anatolia). Although supported by a small number of sites, the practice of intentional fragmentation of ceramic vessels is also possibly related with Aegean traditions, again hinting at the role of the main river valleys as important routes between the coast and the central plateau. Lastly, the Afyon region and the Porsuk-Sakarya plains again emerge as an important interface between the western Anatolian highlands and the central plateau: extramural cemeteries and east/south-east head orientation are typical of western funerary practices, with the combination of jar, cist and pits graves containing single interments are typical of central Anatolia, and the elite funerary sets have close parallels with the northern Kızılırmak bend. Even though a detailed research was not carried out, the regional funerary traditions traced for the EBA seem to persist into the MBA and LBA, with cremation burials being the only main addition to the already-existing range of practices (Akyurt 1998:maps 1-7; Massa 2014b:89).

As a last remark, the cemeteries of Demircihöyük-Sarıket and Kalınkaya (belonging to little hamlets c.0.3-0.4ha in size), provide an interesting case for the imitation of elite behaviour among smaller communities. In both cases, artefacts that likely represented status-symbols, a knobbed mace and three metal standards, are reproduced in non-precious metals and/or with less

[53] Or different phases of the same site: cf. Bakla Tepe "EB I" and "EB II late-III" cemeteries (Şahoğlu in press).

sophisticated techniques than objects of the same type found at the large centre of Alacahöyük (fig.7.29, Massa 2014b:90; Zimmermann 2006b:285).

7.2 Interaction between Anatolia and surrounding regions

7.2.1 Across the Aegean basin

Given the high quality and density of archaeological investigation, the western and southern Aegean provide an excellent arena to analyse interaction. Extensive contacts within the Aegean basin are documented at least since the Neolithic, with Melian obsidian reaching numerous Anatolian coastal sites (Milić 2014) and pottery from Lemnos/Gökçeada reaching the Sporades (Quinn et al.2010). Western Anatolia, with its "maritime nurseries", seems also to have played an important role in the westward diffusion of the Neolithization process and in the colonisation of many of the Aegean islands (Broodbank 2013:188-189, 212-214). The distribution of Melian obsidian and marble pointed beakers indicate the persistence of such exchange networks during the LCh period as well (section 8.3.3). Papadatos and Tomknis (2014) have further convincingly argued for the existence of Aegean-wide exchange networks of metals, ceramic vessels and ornaments in the late 4th millennium BC, and for the establishment of "trading communities" in various areas of the basin. Moreover, previous chapters documented the intensification of contacts between western, southern and eastern Aegean during the following EBA, witnessed by the circulation of raw metal and obsidian (sections 6.1-6.2), sealed goods (section 5.2.3.1), sealing technology, potter's wheel technology and metrology (sections 5.1-5.2-5.3), and funerary practices (section 7.1.4). The following section aims at complementing this dataset by looking in more detail at the circulation of finished products that can be employed as markers of interaction, with particular attention to distinguishing between exchange of objects and adaption/imitation of shapes in contexts of local production. In line with the analytical strategy employed in previous chapters, the choice of the types under investigation has been directed by the availability of already-published studies, with the awareness that they do indeed represent only a small portion of the available dataset.

7.2.1.1 Western/southern Aegean and "Aegeanizing" products in Anatolia

A significant limitation to understand patterns of interaction from a pottery perspective is that, with the exception of a small preliminary report (Day et al.2008), there has been so far no technological, petrographic or chemical characterization analyses on western Anatolian EBA ceramic assemblages. Also very little has been published concerning analysis of stratigraphically-closed contexts, and statistics are generally not provided. Even in absence of detailed analyses, the range of wares classified as “imported” from Cyclades or mainland Greece at Poliochni, Thermi and Troy however bears witness to the intensive circulation (and possibly also local re-elaboration) of western Aegean products along the Anatolian coast. These include for instance the “Early Aegean Ware”, “Scored Ware”, “Glazed-slipped” (Urfirnis), “Early Helladic Ware”, “Dark-on-Light Painted Ware”, “Pattern-incised Decorated Ware”, “Cycladic Painted Ware” identified at Troy and Poliochni (Bernabò-Brea 1964:582-585, 649-651; Blegen et al.1950:53-55). Three main shapes (sauceboats, “frying pans” and duck-shaped askoi) have however received enough analytical attention to be successfully employed as indices of interaction between the eastern Aegean seaboard and the western/southern Aegean, and will be discussed below.

Sauceboats are pouring vessels with an extravagantly long spout, often with a pedestal (fig.7.30), and are part of a larger dining set present in the Aegean during the earlier 3rd millennium. Their distribution suggests two main core areas in the Cyclades and Argolid/Saronic Gulf, with a smaller group in Crete and eastern Aegean (fig.7.32), as also indicated by distinct ware groups, particularly the Cycladic pattern-painted and the glazed (Urfirnis) products from the mainland (Broodbank 2000:234-236). Sauceboats are easily recognisable as imported products in Anatolia because of their shape, fabric and surface treatment (fig.7.30c-f). A single fragment comes from Thermi V (c.2600-2500 BC, Lamb 1936:91, fig.32.521), three from Poliochni Green (c.2700-2600 BC, Bernabò-Brea 1964:409, pl.CXXX.g; Cultraro 1997:99), five from Troy I mid-late (c.2600-2500 BC, Sotirakopoulou 2008:541), while a large number of pieces were retrieved at Limantepe between levels VI-1c and V-3 (c.2800-2600 BC, Şahoğlu 2004:100). Petrographic analysis on Limantepe’s pieces indicates that they are all imported and mostly belong to a homogeneous fabric group of probable Melian origin (Day et al.2008:342), while a single yellow-mottled piece is possibly from Argolid (Şahoğlu 2011:137-138). The shape is also locally adapted and reproduced in other media, as shown by the limestone piece from Limantepe (Şahoğlu 2004:102), and the gold double sauceboat from Troy IIg (fig.30e, Antonova et al.1996:32).

“Frying pans” (fig.7.31) are shallow pan-like circular vessels dated between c.2800-2300 BC (“Kampos” and “Keros-Syros” groups). John Coleman counted c.200 ceramic pieces between mainland Greece, Cyclades and Crete, in addition to three marble pieces from the Cyclades and, intriguingly, three copper-alloyed pieces from Alacahöyük grave A (dated c.2550-2350 cal BC, fig.1.11) and Horoztepe (1985:193). Although their function is still uncertain, most pieces are found in graves and, in particular at Chalandriani, they are associated with wealthy burials[54]

[54] As is also the case for the Anatolian specimens at Alacahöyük and Horoztepe.

(Coleman 1985:203). In most cases, they are richly decorated and finely crafted, a further hint that they might have been valuable items; Cyprian Broodbank argues for a ritual/symbolic significance of these objects (2000:251). While the Cyclades were in all likelihood the main manufacturing area and these products were exchanged across the region, Coleman's typological analysis of both compositional elements and decorative styles clearly demonstrates the existence of different local traditions in Euboea and central Greece as well (1985:196-201). Several fragmentary pieces recently found at Limantepe and Bakla Tepe, despite close similarities with western Aegean examples, all appear locally made, as also the two (possible) fragments from Kadıkale and the crude example from Karahisar (figs.7.31c-g, Akdeniz 2011:figs.1-2; Şahoğlu 2011:172-173). Once again, while the spatial distribution of these objects mostly reflects a maritime circulation, the Karahisar specimen highlights the penetration of Aegean influences up the Büyük Menderes valley (fig.7.32). The Alacahöyük and Horoztepe findings are instead rather unique, as there are no other known Aegean/"Aegeanizing" products so far inland, and they may have reached the sites via the Black Sea maritime route.

Duck-shaped askoi are small liquid containers (for perfumed oils?), and are diffused mostly across the southern Aegean and Cyprus between c.2200-1800 BC (fig.7.33, Benzi 1997:388-392; Rutter 1985; Marketou 2009:51-52). In Anatolia, several fragments are found in Troy IV levels, one in Heraion IV, one in Aphrodisias "BA 4" and another (more dubitatively) in Beycesultan IX, all dateable to c.2150-1950 BC (Benzi 1997:390). While the peculiar shape of these items remains recognisable across the whole area, clear differences in fabrics, surface treatments and decorations indicate the existence of several production centres on Cyprus, the Dodecanese, the Cyclades and Argolis (Marketou 2009:52), again suggesting a process of local adaption of the form, and possibly also local manufacture of the contents. Duck-shaped askoi are among the earliest Aegean/"Aegeanizing" ceramic products reaching the southern Dodecanese and Cyprus (during the Early Cypriot II-IIIA, c.2200-2000 BC), and seem thus to mark the beginning of more intensive contacts between the two areas, possibly aided by the introduction of sail technology in the area around the same time (cf. Broodbank 2013:353-354).

This picture can be further complemented with analyses presented earlier chapters. Of particular value is the reconstruction of the Melian obsidian exchange networks, which provided a quantitative index to assess the intensity of these exchanges, based not only on the quantity but also on the typology of obsidian products reaching each site (section 6.1). Fig.7.34 shows the cumulative distribution of all the pottery types presented above, in addition to several categories treated in earlier sections: spool weights, Cycladic figurines (seated and Dokathismata types), "Aegeanizing" sealings/seal-stamped pottery, and the three different zones (core, supply, contact) that emerged from the analysis of Melian obsidian. Two additional strands of evidence are provided by the occurrence of cist-only/rock-cut grave cemeteries (section 7.1.4) and the so-called horseshoe-shaped bastions, appearing as elements of defensive architecture at several mid-late 3rd millennium western Aegean sites including Lerna IIIC, Palamari, Panormos, Aigina V, Kastri, Markiani and Limantepe V-2b/V-1, all dated between 2500/2400 and 2100/2000 BC (fig.7.35, Kouka 2013:570-571; Şahoğlu 2008:488). In light of these, four main areas in Anatolia can be identified in relation to the intensity of contacts with Cyclades/mainland Greece:

a) ***the central eastern Aegean seaboard*** (from Limantepe to Kap Krio/Nysiros), whose sites receive significant amounts of Melian obsidian (35-60% of the total chipped stone) and most of the western Aegean/"Aegeanizing" products treated here, in addition to the occurrence of funerary practices (cist-only/rock-cut grave cemeteries) and defensive architectural elements (horseshoe-shaped bastions) that are typical of the Aegean islands;

b) ***the north-eastern Aegean seaboard*** (from Emporio to Poliochni/Troy), whose sites receive substantial amounts of western Aegean/"Aegeanizing" products, but only limited amounts of Melian obsidian (c.1-8% of total chipped stone assemblages, ready-made products-only), and where at present there is no evidence for "frying pans", Cycladic figurines or horseshoe-shaped bastions, and limited numbers of Cycladic marble vessels (only at Poliochni);

c) ***the Büyük Menderes-Gediz triangle***, where limited amounts of Aegean goods travel upstream, and where there are several examples of local re-elaboration of Aegean products (e.g. the ceramic imitation of Dokathismata-type figurines at Çine-Tepecik, or the crude copy of a "frying pan" at Karahisar);

d) ***inland Anatolia*** (east of the coast), where Aegean products only sporadically occur.

At present, contacts from Crete to Anatolia are scarcely documented, likely because there are no extensively-excavated and well-published sites in south-western Anatolia and the Dodecanese, the area where interaction would have been more intense. Evidence is limited to two seals from Limantepe and Bakla Tepe of probable Cretan manufacture (**St069** and **St075**, section 5.2.3), a Limantepe bowl whose petrographic analysis indicates its origin to be the Gulf of Mirabello (Day et al.2008:342), and a small silver double-axe pendant from Karataş V that has its closest parallel in EM II Mochlos (Mellink 1967:265).

7.2.1.2 Western Anatolian and "Anatolianizing" products

Overall, there has been much more interest in identifying Aegean products in Anatolia than Anatolian products in the Aegean, for reasons that at least partly depend on the scarcity of detailed publications that could provide comparative materials, particularly in the area where one would expect most of the interaction to have occurred (i.e. the central eastern Aegean coast). However, it has been long recognised that the "Kastri/Lefkandi I" horizon (c.2400/2300-2100 BC) is a phase in which a number of typical Anatolian drinking/pouring shapes gradually spread across Cyclades and mainland Greece, together with the first employment of tin bronzes at a few sites and preceding the introduction of the potter's wheel, often employed to locally produce these shapes (Pullen 2013; cf. Renfrew 1972:172-174 for the first mention of the phenomenon). This "Anatolianizing" drinking set (composed of tankards, depa, bell-shaped cups and cutaway-spouted jugs, fig.7.36) seems to have gradually replaced the earlier EH/EC II one (composed of sauceboats, saucers, handle-less bowls, one-handled goblets), and it has been suggested representing a switch towards different forms of feasting practices in the area (Pullen 2013:546-548). In all sites where these shapes are present, they do however represent a minority of the pottery assemblage and in most cases only some of the "Kastri/Lefkandi I" forms are present at any one site (Broodbank 2000:fig.103; Pullen 2013:546). Broodbank also argues that a large proportion of the "Anatolianizing" assemblages are in fact locally manufactured in several areas of the western Aegean as well (2000:312-313). This is confirmed by petrographic analyses indicating that most of the "Anatolianizing" shapes from Panormos, Akrotiri and Ayia Irini were either produced on site or at other Cycladic settlements (Day et al.2008:343).

The cumulative distribution of cutaway-spouted jugs, tankards, bell-shaped cups and depa shows that they are mostly concentrated in areas closer to mainland Anatolia, while there is little or no evidence for the spread of this drinking set to Peloponnese or Crete (fig.7.36). Similar patterns are identifiable in the occurrence of tin bronze objects, all dated c.2400-2200 BC and originating in central Anatolia or beyond (sections 6.2.5-6.2.6), and are again concentrated within the Cyclades/Attica/Euboea triangle (at Dhaskalio C, Lithares, Aegina, Kastri, Ayios Kosmas and Manika), but not in Crete or Peloponnese (fig.7.37). Lead isotope analysis on several silver objects from Naxos and Ayia Irini also indicates the employment of north-western Anatolian silver in addition to Lavrion and Siphnos ores (Legarra-Herrero 2014:6, fig.3). A slightly different picture (fig.7.37) is provided by the few sealings/seal-stamped pots with angle-filled cross design (possibly but not definitely originated in Anatolia) at Geraki, Myrtos, Skoteini, Ayia Irini, Chalandriani and Lerna (section 5.2.3.2). Hints for contacts between Anatolia and Crete are also provided by the very small amounts of Göllü Dağ/Nenezi Dağ obsidian (in the range of c.0.2-1% of the total chipped stone assemblage) at EM IIa Knossos and EM IIb Malia, in addition to the Cycladic sites of EC Ib Ano Kouphonisi and Dhaskalio B-C (Carter and Milić 2013:541).

On top of the already-discussed type III "discoid" loomweights, that appear at several sites in the eastern Aegean in earlier or contemporary phases than in Crete (section 7.1.2.1), additional evidence, although more circumstantial, can be gathered for contacts between the Anatolian mainland and Crete. For instance, Massimo Cultraro proposes the north-eastern Aegean seaboard as the origin of several late 4th-early 3rd millennia ceramic shapes later found on the island, including vessels for dairy production (cheesepots and butter churns), stemmed cups and bell-shaped lids with triangular lugs (2009, 2013a). Furthermore, significant quantities of gold are found on Crete during the EM I-III period (c.2800-2000 BC) at Gournia, Archanes, Phourni, Mochlos and the Mesara plain (Legarra-Herrero 2014:2-7:figs.2, 5). Although provenance analysis has not been performed on any of the Aegean gold objects, at least a portion of the Cretan assemblage is likely to have arrived through the eastern Aegean coast either from south-eastern Bulgaria or the large gold deposits of the Troad and İzmir region (section 6.2.1), as also suggested by the scarcity of 3rd millennium gold artefacts from the Cyclades and mainland Greece (fig.7.38).

Based on the spatial distribution of these products, different areas can be identified regarding the intensity of interaction between western Anatolia and the western/southern Aegean basin:

a) ***Attica, Euboea, the Cyclades and the Sporades*** (with the key gateway sites of Manika, Palamari, Ayia Irini, Kastri, Kolonna and Dhaskalio) emerge as the region with the highest amount of Anatolian/“Anatolianizing” objects, likely in virtue of their closer spatial proximity to the eastern Aegean seaboard. In particular, it is very clear that the contacts between the central Anatolian coast and Attica/Euboea are funnelled to a large extent by the “Cycladic corridor”, while the Sporades (via Lemnos) channel movement between Euboea/Thessaly and the Troad;

b) ***Crete*** also provides a range of evidence for early contacts with western Anatolia (butter churns, stemmed cups, discoid loomweights, possibly gold), in addition to minute amounts of Göllü Dağ/Nenezi Dağ obsidian in the later EBA, exchanges mediated by the Cyclades but also likely via the Dodecanese. Intriguingly however, no late-3rd millennium “Kastri/Lefkandi I” assemblages are found on the island with the exclusion of the two Lebena tankards (Cultraro 2009:235). This suggests that, after the intense relations with the Cyclades in the preceding “Keros-Syros” phase, Crete might have re-oriented towards the east in the later EBA, as indicated by the appearance of Levantine products on the island after c.2500 BC, likely mediated by the southern Anatolian coast (section 7.2.4);

c) ***the Peloponnese,*** with the available evidence, seems overall to receive only sporadic Anatolian/“Anatolianizing” products, limited to the Lerna and Tiryns depa and possibly a few sealed containers and seal-stamped pots at Lerna and Geraki.

7.2.1.3 Circulation of products within the Aegean basin

Even though, for reasons outlined above, a fine-grained assessment of interaction dynamics in Anatolia is not available, works carried out on Cretan materials over the last 20 years may be useful to compare in order to suggest possible parallels (cf. Day et al.1998, 2012; Papadatos and Tomkins 2014; Whitelaw et al.1997). Here, an in-depth chrono-typological classification of the materials, functional analysis and petrographic-chemical analyses indicates that a large proportion of vessels (from fine table wares to transport jars) arrived at individual EBA sites from a limited number of production centres located up to 20-30km away (Whitelaw et al.1997). This suggests intensive circulation of utilitarian ceramic products, and a level of craft specialisation higher than we can at present grasp from the archaeological evidence. Additionally, at Ayia Photia (c.2800-2600 BC) the large amounts of "Cycladic" pottery, virtually undistinguishable from actual Cycladic products in term of firing technology, surface treatment, decorations and shapes, turned up to have been produced with eastern Cretan clays, a pattern possibly suggesting the movement of Cycladic craftspeople to Crete (Day et al.2012). It would not be surprising if a similar picture will emerge in western Anatolia as well, when more analysis will be carried out.

This notwithstanding, the data presented above clearly indicate the circulation not only of finished vessels, but also of products contained by vessels (oil, wine, perfumes?) and technologies related to pottery production, in addition to a persistent and substantial process of local re-elaboration of forms, surface treatments and decorations witnessed between the western, southern and eastern shores of the Aegean basin. The appearance of western Aegean storage vessels (from c.2700 BC onwards) at Poliochni Green, Troy IIb and Limantepe V (Şahoğlu 2011:173) further indicates the inclusion of bulkier products within larger-scale networks, possibly in connection to the more widespread use of longboats. In this sense, the Dokos shipwreck (section 3.1.4) provides an exceptional insight into late EBA maritime exchanges: its cargo contained, in addition to large amounts of ready-made obsidian blades and a lead ingot, c.500 vessels ranging from fine table wares, to kitchen wares and storage jars (Carter 1998:52; Parker 1992:162; Webb 1992). The ship inventory intriguingly suggests that, at least during the late EBA, both utilitarian vessels and large jars might have been a common exchanged element in addition to more precious items (e.g. marble, metal, perfumes, small valuable ceramic products).

The exchange/reproduction of objects with possible ritual connotations, for instance the "frying pans" and Cycladic figurines, in addition to specific funerary practices (e.g. cist-only/rock-cut cemeteries, intentional pottery fragmentation), may also suggest the circulation of cultural behaviours as well. Their absence in certain areas (for instance the "frying pans" and Cycladic figurines in the northern Aegean, or the "Anatolianizing" drinking set on Crete and in the Peloponnese) might be related with the patchiness of the archaeological data, but more probably reflects a real pattern. Since other categories of products with the same origin do indeed reach these areas, it can be argued that the rejection of "ritual" objects/practices by some groups may have been intentional, reflecting careful maintenance or conscious creation of a cultural distance (also related to physical distance, sections 2.1.2.2, 2.3.5) between different human groups living on the Aegean.

7.2.2 Between the Circumpontic area and northern Anatolia

Contacts between Anatolia, the Caucasus and the Balkans will be treated here in less detail not only because most research in the area around the Black Sea has been, until recently, published in languages difficult for me to access (e.g. Russian, Romanian, Bulgarian, Georgian), but also because a coherent understanding of the archaeological processes in this region has been hampered by difficulties in creating overarching chronological frameworks, which are only now slowly coming into focus (cf. Anthony 2007; Boroffka 2013; Nikolova 1999). Furthermore, there are virtually no excavated sites in the area that would have most likely been the main interface between the northern and southern Circumpontic communities, namely the northern Anatolian coast between Troy and İkiztepe (more than 1,000km). Similarly, both in central and eastern Anatolia (an area extending from the Kızılırmak river to modern Erzurum) there are at present very few stratified and well-published excavation projects focusing on the early-middle EBA, with the result that contexts and dates for the finds discussed are often unknown. This notwithstanding, several works have already collected evidence for contacts between northern Anatolia and areas further north, north-west and east, that will be presented below in a coherent fashion. Two main spheres of interaction can be distinguished, one in the west, connecting south-eastern Europe with north-western Anatolia, the other in the east, connecting the Kızılırmak bend with eastern Anatolia and the Caucasus.

7.2.2.1 The western Circumpontic area

The recently excavated and well-published site of Kanlıgeçit in eastern Thrace (Özdoğan and Parzinger 2012) provides at present the best context to understand relations between north-western Anatolian and south-eastern Balkans across the 3rd millennium. The earlier part of the EBA stratigraphic sequence (KG 4-3, c.2800/2700-2400 cal BC) reveals a small settlement with cultural assemblages typical of the southern Bulgarian EBA (Ezero and Yamnaya), not only in terms of pottery, but also with regards to tools (horn handles, loomweights, flint blades), weaponry (“Pontic” hammer-axes), architecture (wattle-and-daub freestanding houses) and the presence of domesticated horse (Benecke 2002; Özdoğan and Parzinger 2012:267-270). The only clear evidence for contacts with the south is represented by two clay figurines of the “Bavurdu type” (section 7.1.1.2, type II.1), found in KG 3 contexts (Karul 2012). After the complete destruction of the hamlet (radiocarbon-dated to c.2500-2350 cal BC), new Anatolian elements seem to more or less abruptly appear, even though they keep co-existing with local traditions (phases KG 2-1). Foreign elements include monumental architecture with striking parallels to Troy (fig.7.39), the employment of stone and mudbrick for buildings, Anatolian pottery shapes and wares (c.17% of the total assemblages), and the appearance of wheelmade pottery and tin bronzes (Özdoğan and Parzinger 2012:270-277). Since the excavations mainly targeted the Kanlıgeçit "citadel" and the surrounding residential quarters are only scantily known, it is at present difficult to assess whether these new Anatolian elements mark the arrival of Anatolian groups at the site or instead represent the efforts of local leaders to imitate elite practices of communities further south. This notwithstanding, the striking architectural similarities of Kanlıgeçit's elite area with Troy IIc, the presence of locally-manufactured wheelmade vessels in typical Anatolian shapes and the occurrence of imported goods from the south suggest at least the movement of specialised craftspeople and builders, and intense interaction with Anatolian communities (Özdoğan and Parzinger 2012:273).

The picture from Kanlıgeçit is further corroborated by finds from archaeological surveys and excavations in the surrounding region. During the early-mid EBA, the occurrence of (locally-manufactured? imported?) Anatolian pottery in eastern Thrace is restricted to sites along the Marmara Sea coast (fig.7.40a). After c.2500/2400 BC ("Troy II" horizon) Anatolian/"Anatolianizing" wares (pilgrim flasks, depa, tankards and "Syrian" bottles) penetrate further inland (fig.7.40b, Leshtakov 2002), with Kanlıgeçit being the northernmost settlement with evidence for local production of these wares.

At a broader scale, evidence for episodes of cultural transfer between Anatolia and the Balkans is available at least since the late 4th millennium, in various forms that range from architectural elements to funerary practices, from technological transfers to finished products. A striking point of connection is for example provided by three anthropomorphic stone stelae (fig.7.41), one found in secondary context within the fortification wall of Troy Id (c.2800-2700 cal BC), another found in a much later (Troy VI) context, but also of possible early EBA date (Blegen et al.1950:155-157, figs.93, 189), and the third a chance find near the mound of Helvacıköy-Höyücek (Doğer 1995). While these objects have no parallels in contemporary or later Anatolia, they have precise counterparts in the several hundred funerary stelae found between the northern Caucasus and western Europe during the 4th and early 3rd millennia, and particularly the Yamnaya and Kemi-Oba horizons in the northern Black Sea (Anthony 2007:336-339; Robb 2009).

Another point of contact in terms of funerary practices is provided by the late 4th millennium cemetery of İkiztepe on the southern Black Sea coast. Here, the normative body position is supine and extended, and often the deceased is sprinkled with ochre; while there are no parallels for this in Anatolia, most LCh and early EBA burials along the Black Sea coast present the same interment practice (Welton 2010:134-141). Another element is the diffusion of free-standing apsidal houses, composed of a rectangular room with a semi-circular back and pitched roof that contrast with the normal western and central Anatolian domestic architecture, characterised by agglutinated buildings with flat roof. This peculiar architectural module appears (always in isolation) at most early 3rd millennium coastal Anatolian settlements, with Poliochni Black being the oldest known apsidal house (c.3200-2900 BC); roughly synchronous counterparts are found at Sitagroi V, Karanovo VII and Vučedol 8 (fig.7.42, Warner 1979).

Contemporary with, and possibly associated to, the spread of the apsidal house is the diffusion of peculiar terracotta "anchor hooks", crudely-manufactured objects in the shape of single or double hooks with rivet holes at one extremity, for which a function as weaving tools has been suggested (fig.7.42, Hüriyılmaz 2001). In absence of detailed analysis, it can only be proposed that their abundance, the cheap manufacturing material (clay) and the simple shape hint for the circulation of the concept and shared (weaving?) techniques, rather than exchange of finished products. Their early distribution area spans from eastern Macedonia to southern Bulgaria and coastal north-western Anatolia (Bernabò-Brea 1964:588-589; Hüriyılmaz 2001); the best-dated contexts (Poliochni Black, Thermi I, Ezero VII) suggest a 3300-2800 BC horizon for the early pieces. Of later date (after c.2700 BC) is the circulation of a small number of flint winged arrowheads that are foreign to Anatolian knapping traditions[55] and are in all likelihood a Bulgarian product; these were found at Poliochni Green/Red, Kanlıgeçit KG2 and Troy Va (fig.7.42, Bernabò-Brea 1964:677; Blegen et al.1951:231, fig.234.36-116; Özdoğan 2012:232-234). Two small beads of Baltic amber found at Troy IIg (Antonova et al.1996:175, cat.nos.227-228) are a unique and isolated find that might have reached the site from the Black Sea (via the Danube, cf. Czebreszuk 2007). At the close of the 3rd millennium, small numbers of cremation burials (essentially unknown in earlier prehistoric Anatolia) appear at Poliochni Yellow, Troy IIg, Çeşme-Boyalık, Aphrodisas and Kaklık Mevkii (fig.7.42, Massa and Şahoğlu in prep.). Contemporary examples also occur in Macedonia, for instance at Kriaritsi, a cemetery with 120 cremations (Cavanagh and Mee 1998).

Overall, the evidence brought forward here seems to suggest that, even though contacts between north-western Anatolia and Thrace/Macedonia can be detected at least from the 5th millennium (Steadman 1995; Thissen 1993), they seem to become more intense in the EBA, and are characterised by a mutual, bi-directional exchange of products, technologies and behaviours spread across time. In this context, it is thus intriguing that the appearance of "anchor hooks",

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[55] It is worth mentioning that metal, flint and obsidian arrowheads are otherwise unknown in inland west and central Anatolia, with the notable exception of Alişar Höyük and sites further east (cf. Özdoğan 2002).

apsidal houses, cremations and winged arrowheads (in addition to funerary tumuli and the introduction of domesticated horse) in mainland Greece occurs more-or-less abruptly during the EH III period, c.2200-2000 BC (fig.7.42, Hielte 2004; Rahmstorf 2010c:269-271). Despite the fact that, for decades, Aegean archaeologists have staunchly (and in many cases correctly) rejected crude cultural-historical migration models as a way to explain cultural change (e.g. Maran 2007), this phenomenon might indeed be the result of the organised movement of highly mobile groups from Macedonia (Hielte 2004). This set of innovations not only pertain to a range of different spheres of human activity that would be unlikely to be adopted at the same time simply through interaction between sedentary communities, but it further seems synchronous with the destruction or abandonment of many centres of the preceding "Kastri/Lefkandi I" phase (Wiener 2013, 2014). While the region is largely outside the PhD core study area and will not be discussed in detail, it offers a good parallel for the better-studied Karaz/Early Transcaucasian phenomenon (see below) and provides a hint that larger-scale movements of people might have been occurring during the EBA in contemporary with movement of individuals.

7.2.2.2 The eastern Circumpontic area

Northern Anatolia, at least in the 3rd millennium if not earlier (cf. LCh İkiztepe), seems to have been part of the much larger "Circumpontic Metallurgical Province", extending from Ukraine and the Caspian steppe to Bulgaria, Anatolia and northern Iran, an area defined by Evgenyi Chernykh on the basis of shared metallurgical technologies and a large number of metal tool and weapon types (1992, 2008; also Wilkinson 2014b:168-182). In Anatolia, examples of technological transfer include the appearance of silver-copper alloys at Resuloğlu, Mahmatlar, Alacahöyük, Çukuriçi Höyük and Karataş (fig.7.43, Alpers-Bordaz 1978:314; Horejs et al.2010b:19-21; Yalçın and Yalçın 2013:42; Zimmermann and Yıldırım 2011). Earlier experimentations can be traced back to the late 4th millennium in eastern Anatolia, as witnessed by the Arslantepe "Royal grave" inventory (Hauptmann et al.2002:57). Another example is provided by the appearance of lost-wax technique at early EBA Alacahöyük, Demircihöyük-Sarıket and Poliochni Blue (fig.7.43), that suggests the adoption of a skill set already employed on the northern Pontic coast from mid-5th millennium onwards (at Varna and Maikop, Hansen 2014:401-406). Intriguingly, the earliest forged iron objects seem to appear roughly at the same time in Alacahöyük (Yalçın 1999) and northern Black Sea (Anthony 2007:336) shortly before the mid-3rd millennium, again suggesting a possible technological transfer. Further, lead isotope analysis on copper-based items from Poliochni, Thermi and Beşiktepe (in north-western Anatolia) also suggests that some of the raw metals might have come from mines along the eastern Anatolian coast (Murgul group) already in the early EBA (section 6.2.4). Eastern

Anatolian obsidian (from Bingöl/Nemrut Dağ) is also present in small quantities at Çadır Höyük (Kızılırmak bend), the only site in the region with detailed obsidian provenance analysis (Steadman et al.2013:141-145). A further point of contact has been identified in the spread of a major technological innovation in weaponry, i.e. shaft-hole metal and stone axes/maces. The innovation possibly originated in the late 4th millennium northern Caucasus and seems to have subsequently spread across a large area between Aegean, northern Anatolia and the northern Pontic steppe (Cultraro 2014; Rahmstorf 2010c:265-268).

These elements might have reached central Anatolia (and particularly the Kızılırmak bend) through interaction with eastern Anatolian communities, which between c.3500-1600 BC participate in what is known as the "Karaz/Kura-Araxes/Early Transcaucasian" (ETC) phenomenon (Frangipane et al.2001; Palumbi 2009; Wilkinson 2014a among others). This archaeological horizon covers a very large area spanning, at its peak, the metal-rich highlands of southern Caucasus, eastern Anatolia, western Iran and the southern Levant (fig.7.44);[56] in all cases, communities manufacturing and consuming ETC-related artefacts seem to have co-existed in the same areas with groups producing local cultural assemblages. Despite obvious regional differences, the ETC-related sites yield ceramic vessels characterized by shapes, surface treatments and decorations that are shared across the whole area; while petrographic analyses indicate in all cases local production, the vessels seem to have manufactured employing very similar techniques (Wilkinson 2014a:204-205). In addition to pottery, other elements seem to co-occur in several regions, including circular domestic structures, portable horseshoe-shaped firestands, and a range of metal shapes such as the leaf-shaped spearheads (fig.7.44, Palumbi 2009; Wilkinson 2014a:204-205). Despite the fact that, in absence of well-stratified sites, the relation between central Anatolia and the ETC phenomenon has not as yet been addressed in detail, ETC elements clearly occur in early-mid EBA central Anatolian contexts as well, mainly within the Kızılırmak bend, Cappadocia and Cilicia (Rahmstorf 2010c:273-277; Steadman et al.2007; Zimmermann 2010a:336-338).

While the presence of ETC elements in central Anatolia requires further analysis to be understood in depth, numerous works focusing on southern Caucasus, Levant and eastern Anatolia suggest that the ETC phenomenon might have entailed some form of large-scale movement of people at different periods of time and with different modes of interaction towards the local communities. Toby Wilkinson, in the most recent treatment of the subject, highlights how ETC materials seem distinctively intrusive in areas outside the Caucasian/eastern Anatolian homeland, and how different diaspora communities seem to have maintained intense

[56] I would like to thank Toby C. Wilkinson for sharing with me his GIS data on the occurrence of ETC-related wares, employed in figure 7.44.

connections with each other across a considerable span of time (2014a). This is for instance witnessed by similar, conservative practices in pottery manufacture, persistently hand-made in contrast to the widespread use of the potter's wheel in the same areas, and possibly in culinary traditions as well, with an emphasis on shapes for boiling, stewing and steaming food as opposed to ceramic forms for roasting and baking typical of the Late Uruk repertoire (Wilkinson 2014a:213-214). It is also perceptible in the intentional rejection of elite behaviours typical of Upper Mesopotamian and Levantine stratified societies with which they were interacting (e.g. monumental architecture, administrative technology, luxury goods, Wilkinson 2014a:214-219). Well-investigated sites such as Arslantepe, Tell Beth Yerah and other southern Levantine settlements further highlight a range of different modes in which ETC communities may have interacted with their neighbours, from outright conflict to peaceful co-existence (within the same settlement) to cultural assimilation across a relatively short span of time (Frangipane et al.2001; Iserlis 2009; Paz 2009).

7.2.3 Overland exchanges between Mesopotamia and Anatolia

As already discussed (section 1.7), with the exception of Alişar Höyük and Çadır Höyük (the first excavated in the 1920s, the second known only from a preliminarily-published small trench) there are no well-stratified and well-published early-mid EBA sites between Demircihöyük/Küllüoba and Cilicia (Gözlükule), Upper Euphrates (Arslantepe) and Middle Euphrates sites, an area extending some 500-600km in diameter. Most of the evidence for contacts with Upper Mesopotamia thus mostly comes from western Anatolia, an area that was likely at the periphery of this network and witnessed the arrival of Mesopotamia-originated artefacts and cultural elements at a later stage than the supposed main interface zone (Cappadocia and Konya-Karaman plains). These limitations also mean that we are at present unable to understand smaller-scale patterns of interaction between communities at either side of the Taurus-Antitaurus mountain range, that would have likely shed light on circulation of goods and behaviours pertaining to non-elite, more mundane spheres of social activity. This notwithstanding, a significant range of evidence has already been produced in earlier chapters with regard to spread of Mesopotamia-originated technological innovations such as metrology, potter's wheel and sealing practices in the early-mid 3rd millennium (chapter 5), and the circulation of Anatolian metal and obsidian in Upper Mesopotamia and Levant at even earlier times (chapter 6, section 8.3.3). This dataset will be here complemented with the analysis of artefacts whose distribution highlights overland connections between Anatolia and the Near East, including the "Syrian" bottles, a particular group of metal anthropomorphic figurines, lapis lazuli artefacts, carnelian, and a small group of Anatolia-originated artefacts that find their way further east.

7.2.3.1 "Syrian" bottles

The so-called "Syrian" bottles are a distinct group of small containers (between 6-23cm in height and 4-12cm in width, with volumes between 8-100cl) that likely contained valuable liquids such as oils, perfumes, or cosmetics (Ay et al.2014; Palmisano 2015:91; Zimmermann 2005:164). The form originated along the Middle Euphrates in early ED III times (c.2700-2600 BC) and gradually spread to the north along the Euphrates, to the east towards Khabur and Balikh, and to the west/northwest towards Anatolia and beyond (Schachner and Schachner 1995:86; Tonussi 2007:236). In Upper Mesopotamia, two main typological groups have been identified: the globular bottles (figs.7.45a, b, g), which tend to be earlier and disappear in early Akkadian times (around c.2300-2250 BC), and the alabastra (figs.7.45l, p), which start in the late ED III period (c.2500-2400 BC) and continue until the mid-2nd millennium (Kühne 1976:37-38; Orthmann and Rova 1991:136-142). Along the Euphrates and northern Syria, these bottles are always wheelmade, well-fired, thin-walled and are manufactured in a limited number of wares, broadly grouped into "Metallic Wares" (Ring Burnished, Grey Jazirah and Stone Wares) and "Simple Wares" (Brown Ware and Euphrates Banded Ware, Tonussi 2007:236-237). Recent works have started to collate the evidence of "Syrian" bottles in EBA Anatolia and to shed light on possible mechanisms for their exchange (Rahmstorf 2006b; Tonussi 2007; Zimmermann 2005, 2006a). Missing from these studies are however a detailed analysis of their possible origin and their contextual dating, and the full published spectrum of finds (39 metal and 48 ceramic specimens from 17 EBA sites, figs.7.45-7.47), that will thus be discussed below.

The assessment of the origin for the Anatolian specimens is in most cases provisional, because detailed pottery fabric analysis has been conducted only at Küllüoba (Türkteki 2010). Nonetheless, it can be argued that the excavators would have recognised the origin of a bottle based not only on fabric, but also on surface treatment, production technique and firing, and would have further been able to distinguish between Anatolian products typical of the site and neighbouring region and bottles produced elsewhere in Anatolia. Three categories can thus be distinguished: a) direct imports from northern Syria, b) imports from other Anatolian production centres, and c) Anatolian bottles produced on site or immediate vicinity. Probable direct Upper Mesopotamian imports are found in Cilicia, Cappadocia and the central plateau (fig.7.48). Products that were likely manufactured on site or in its vicinity are attested at Kültepe, Troy and Gözlükule in levels roughly contemporary with the direct imports, while bottles of probable Anatolian production are found at Palamari (Sporades), Galabovo (eastern Thrace), Küllüoba (north-western fringes of the central plateau) and Alişar Höyük (Kızılırmak bend). Furthermore, there are numerous examples made of metal (gold, silver, Cu-alloy and lead) at Eskiyapar and

Gözlükule (alabastra), Troy, Polatlı, Demircihöyük and Küçükhöyük (globular bottles), which are in all likelihood local adaptations of the form.

Locally-manufactured bottles display in several cases a significant degree of adaptation concerning forms, production techniques (with a few handmade pieces), fabrics/surface treatments (e.g. Red-Coated and Black Polished Wares) and materials (45% of the total dataset is made in metal). The local production further suggests that their contents (arguably, the valued element) were also locally manufactured, therefore perhaps involving also significant amount of sharing of technological knowledge on perfume/cosmetic production between different communities of practice, rather than simple imitation of the container. The chronological distribution of the bottles further provides some hint regarding the extent and intensity of Syro-Anatolian-originated exchange networks in Anatolia (fig.7.47). Given the scarcity of early EBA excavated sites in Cappadocia and the central plateau (section 1.7), it is not surprising that the earliest "Syrian" bottles appear at the north-western fringe of the central plateau at the cemeteries of Küçükhöyük and Demircihöyük-Sarıket (35 lead globular bottles, in all cases likely imitations). In the latter, two specimens from graves 100 and 141 are associated with ceramic vessels that have precise parallels in settlement's levels L-M-N, radiocarbon-dated to 2670-2610 cal BC (fig.4.4), thus almost contemporary with the earliest Syrian productions. Several direct imports occur at Kültepe starting from level 15 (c.2500-2400 BC, the earliest documented layer at the site), after which the bottles (both imported and locally-made) become increasingly common across the central plateau, at a time when they also reach Troy and Alişar Höyük. Single occurrences at Galabovo and Palamari (c.2200-1950 BC) represent the westernmost findspots of this type. While "Syrian" bottles continue to be in fashion in Upper Mesopotamia until the mid-2nd millennium, they ceased to be produced and imported in MBA western Anatolia, since the westernmost finds are those of Kültepe karum Ib and nearby sites (Palmisano 2015:93).

7.2.3.2 Other ceramic vessels

The occurrence of direct Syro-Anatolian ceramic imports in Anatolia is further witnessed by two other small vessel types: beakers and tubular-lugged small jars. Beakers likely originated in the area encompassing the Amuq and Euphrates valleys and were produced from late ED III times to early post-Akkadian (c.2600-2100 BC), always wheelmade and often manufactured in "Metallic Ware" (Türkteki 2010:99). They are present in large quantities in Gözlükule "EB II levels" (c.2600-2400 BC) and a few specimens appear in Kültepe level 14 (c.2500-2400 BC) and Küllüoba level IIIA (c.2300-2200 BC); judging by their technique and surface treatment, they are probably direct imports (fig.7.49, Türkteki 2010:112, 126, 168-169). Closely related metal beakers are also known from the Trojan “treasures” A and B (in gold and silver, Antonova et al.1996:cat.nos. 6, 7, 103) and the Eskiyapar hoard (in silver, Özgüç T and Temizer 1993:pl.116.13-14), dateable to c.2300-2200 BC and probable local productions imitating Syro-Anatolian prototypes. Small jars with twin tubular lugs typical of the Middle Euphrates valley (fig.7.49), possibly containing valuable products, are also represented by few specimens in Gözlükule “EB III levels” and Troy IIg (c.2300-2200 BC, Kühne 1976:49-50). At Troy, one piece is a probable direct import made in “Grey Jazirah Ware”, while the other two are clearly local productions since they are handmade and made of typical “Early Aegean Ware” (Kühne 1976:50; Tonussi 2007:254).

7.2.3.3 Lead anthropomorphic figurines

This small group of finds comprises metal figurines and moulds for their production, found across a large area spanning from southern Mesopotamia to western Anatolia between c.2400 and 1700 BC (figs.7.50-7.52). While they have already been extensively studied (Canby 1965, 2003; Efe 2006b; Emre 1971; Marchetti 2003; Tonussi 2007 among others), new and old finds will be employed to provide a different perspective on their circulation and the cultural milieu in which they were consumed. These figurines are always made of lead, are small (normally c.6-8cm high), flat (c.2-4mm thick), and manufactured in open or bi-valve moulds that in most cases also included die for the creation of other objects such as pendants, seals, earrings, beads and plaques (fig.7.50). The earliest pieces, dateable between c.2400-2100 BC (e.g. Troy, Tell Brak, Urkesh, Tell Jassa el-Gharbi, Titriş Höyük), always portray a single adult female, naked apart from items of jewellery (hair-rings, necklace and belt), with braided hair and in the act of holding/squeezing one or both breasts (figs.7.50.3-4, 7), or with her arms folded on the abdomen (figs.7.50.1, 6). While Kutlu Emre identifies these figurines as depictions of a goddess (1971:129-130), Monica Tonussi convincingly argues that they represent female worshippers: not only they lack any divine attribute, but also the breast-squeezing is an apotropaic gesture well-attested in Anatolian and Near Eastern ancient iconography and also among a varied range of present-day ethnographic communities (2007:144-145). Between c.2100-1950 BC, male/female couples are also added to the repertoire, sometimes together with a child (e.g. Küllüoba and Acemhöyük); again, the woman is represented naked, while the male is clothed with a long robe of probable Mesopotamian style (figs.7.50.8-9). Only during the early MBA (c.1950-1750 BC) depictions of deities make their first appearance in Anatolia, either coupled with a male human (a king? figs.7.50.11-12), or alone (fig.7.50.14-16), and are characterised by a range of different divine attributes typical of earlier and contemporary Mesopotamian figurative art (horned hats, wings, swords, wild animals, bull-heads, long beard, staffs) that possibly identified them with specific gods and goddesses (Emre 1971:134-138; Marchetti 2003:409).

Their appearance in EBA Anatolia seems to represent a significant break with earlier figurine traditions (section 7.1.1). While they probably fulfil a similar function as previous and later figurines (they are also flat, of similar size and made of non-precious materials), the rendering of the details (in particular the facial features) does not have precedents in Anatolia, but has close matches with figurative arts in late 3rd millennium Syria. Even though the gesture of breast-squeezing and hands on the abdomen do exist in earlier Anatolian and Aegean figurines (figs.7.7-7.8), tight stylistic parallels can be drawn with the basin sculptures at Ebla, the Tell Brak ivory figurine and Mari terracotta figurines (Canby 2003:171-173; Tonussi 2007:156-158). Also, as already mentioned, depiction of male figures is extremely rare in EBA Anatolia, and that of male-female couples is thoroughly absent, another hint that the new iconography is probably not local. Lastly, the location of the earliest stratified finds (c.2400-2200 BC) at Tell Mozan, Titriş Höyük and Tell Jassa el-Gharbi (fig.7.52) strongly points to an Upper Mesopotamia origin of the proto-type. Further insight is provided by the stylistic analysis on the objects produced by the moulds that also contained lead figurine casts (both EBA and MBA pieces). On the one hand, there are several convergences in their typology that point to the circulation of shared artefact shapes between western Anatolia and Lower Mesopotamia. On the other hand, there is a range of items that are only present either in the Anatolian or Mesopotamian moulds, indicating a local production for a local audience (Efe 2006b; Emre 1971:129-130; Marchetti 2003; Tonussi 2007:112-134). This is confirmed by the EBA Küllüoba mould (fig.7.50.2), which display a rather crude version of the figurine, suggesting local manufacture of the mould itself. Further, the employment of lead, their easy reproducibility (mould-cast instead of e.g. lost-wax), and their mediocre artistic quality suggest that these figurines were not meant as prestige objects.

All these elements bring to the conclusion that neither the figurines nor the moulds were probably travelling long distances (certainly not the c.2,500km separating e.g. Troy from Sippar), but rather the concept. There must have been enough shared cultural background and similarities in religious behaviours for these figurines to be accepted in the local communities relatively unmodified, across such a large area. Despite the absence of well-defined contexts for most of the pieces, it is quite clear that EBA and MBA figurines are confined to sites that have extensive evidence of long-distance contacts, are located along trunk routes and can be considered in most cases hubs in the regional and interregional networks. As such, they possibly represent the new religious sensitivity of a cosmopolitan Anatolian audience, exposed to the circulation of ideas and in contact with travellers, traders, and convoys from distant lands, during a phase of intense relations with Upper Mesopotamia. The Mesopotamian character of both female and male depictions, as well as that of the divinities represented, suggests a gradual assimilation of religious traits at least in specific social segments of the Anatolian communities. This process becomes more evident around 1950 BC, with the appearance of recognisable deities that suggests the introduction of a pantheon strongly influenced by Mesopotamian traditions, and whose (often Akkadian!) names are also attested in several Old Assyrian texts (cf. Taracha 2009:25-32). This period coincides with the appearance of large templar buildings (unknown in EBA west/central Anatolia), the adoption of cuneiform writing and complex administrative practices (including archive upkeep, door sealings and the use of cylinder seals), all innovations with a clear Mesopotamian origin. As a last point, lead figurines disappear from western Anatolia after c.2200-2100 BC (fig.7.52, inset), a hint that the area may have re-oriented towards the Aegean world after a phase of intense contacts with the east between 2700-2200 BC.

7.2.3.4 Lapis lazuli artefacts

The occurrence of lapis lazuli in 3rd millennium Near East has been extensively treated by several authors (including Moorey 1994:85-92; Tonussi 2007:323-324; Wilkinson 2014b:125-133). Here I will only discuss the Anatolian pieces in more detail within the context of the exchange routes between this area and the broader Near East. At present, the only known sources of lapis lazuli exploited in prehistory are found in Afghanistan (Wilkinson 2014b:125, with comprehensive bibliography). While the earliest pieces are found in mid-6th millennium Yarim Tepe (northern Mesopotamia), more intensive circulation starts from mid-late 4th millennium onwards, with raw lapis lazuli found in Jebel Aruda and finished objects at Tepe Gawra and in northern Caucasus (Apakidze 1999; Moorey 1994:88). Between the 3rd and 2nd millennia, it was exchanged over a vast area from southern Egypt to the Indus valley and northern Caucasus, but mostly within Mesopotamia where c.89% of all finds are concentrated (74% of the total only in the Ur Cemetery, Wilkinson 2014b:126). Most objects made of lapis lazuli are very small (beads, seals or inlays), though there are a few larger objects (vessels, pendants, a dagger-hilt, a battle axe) that betray excellent craftsmanship and thus the existence of full-time specialists likely attached to elite structures (Moorey 1994:85). Raw lapis lazuli arrived at several Mesopotamian centres (Moorey 1994:85-88), the closest to Anatolia being Ebla where over 40kg of raw stone and working debris were found in the ruins of Palace G (c.2400 BC, Ascalone and Peyronel 2006:50-53). The extreme rarity of lapis lazuli objects in EBA Anatolia, the absence of raw material or production debris found within settlements, and the foreign shapes of the objects suggest that these small items arrived in the area only as finished products (figs.7.53-7.54).

The date of earliest arrival in Anatolia is c.2400-2300 BC, probably from two different directions. The first is the well-defined inland route through northern Mesopotamia; this is suggested by the distribution of the four beads from Kültepe level 13 grave, four cylinder seals from the same site, the Mesopotamian cylinder from Troy level IIg, the macehead from Bozüyük, a single bead from Acemhöyük level IV, and a bead from Yassıhöyük level II. The manufacturing place of these objects is unknown, though Ebla is a good candidate. On the other hand, the origin of the Trojan battle axe is most likely the Caucasus, through the Black Sea route (cf. Wilkinson 2014b:fig.4.3): this is suggested for instance by the close typological similarities with a large range of weapons found across the northern Black Sea and the Caucasus, from earlier, contemporary and later contexts (Antonova et al.1996:219-222). Additionally, several lapis lazuli items with local shapes have been found within Maikop and Trialeti kurgan graves, suggesting that some raw material may have arrived in the area (Apakidze 1999), and from which the Trojan piece may have been manufactured.

7.2.3.5 Carnelian

Small carnelian objects (essentially beads) are a very common occurrence in central and eastern Anatolia, the Black Sea, the southern Caucasus and Mesopotamia already by the mid-late 4th millennium (Moorey 1994:97; Palumbi 2009; Tonussi 2007:326-335). Across the Near East, carnelian is found predominantly in funerary contexts, suggesting a possible symbolic association between mortuary practices and carnelian, a connection also referred to in EBA/MBA Mesopotamian literature (Casanova 2001:166-167). While known primary (quarries) and secondary (placers) deposits of carnelian are presently limited to the Middle East and beyond (fig.7.55, cf. Wilkinson 2014b:133-136 for comprehensive bibliography), one or more sources may have existed somewhere between the Black Sea and the southern Caucasus. This is suggested by the abundance of this material in contexts pre-dating the earliest evidence for Mesopotamian contacts such as Middle Chalcolithic Varna in Bulgaria (Kostov and Pelevina 2008), LCh İkiztepe and the Trabzon hoard (Rudolph 1978). The spatial distribution of carnelian pieces in LCh/EBA Anatolia also closely matches that of Early Transcaucasian features mentioned above (figs.7.56-7.57). Furthermore, some beads from Resuloğlu, Kalınkaya and Alacahöyük (Kızlırmak bend) have shapes not encountered elsewhere, suggesting local production from raw materials (figs.7.58c-d). As such, the occurrence of carnelian in EBA western/central Anatolia is not necessarily linked with the Mesopotamian networks, and may be connected instead with Circumpontic exchange systems. However, there are two bead types whose manufacture is highly specialised and has so far documented only in the Indus Valley, during the Harappan period (c.2600-1900 BC): the “etched” beads, with white paste infilling, and the elongated beads, often reaching 5-6cm in length (fig.7.58, Kenoyer 1997). While such products occur in Lower Mesopotamia already in ED III times (c.2600-2400 BC), they only appear in Anatolia and the Aegean at the end of the EBA, at Troy III, Hattusa levels 9-8c, Yassıhöyük II and Aegina (fig.7.57-7.58). They share with lapis lazuli objects a very similar spatial distribution, their rarity in Anatolia, their presence only at large network hubs and within seemingly elite contexts.

7.2.3.6 Anatolian/"Anatolianizing" products in Mesopotamia

While lead isotope analysis suggests that Anatolian metal (copper, silver and gold) reached northern Levant and Upper Mesopotamia in the EBA (section 6.2.4), there are actually few metal artefacts whose typology points to an Anatolian origin. Given the scarcity of well-published central Anatolian sites, this is partly a research bias, i.e. Anatolian artefacts may have not been recognised as such in Near Eastern assemblages. Nonetheless, it may also partly be a real pattern connected with the generalised practice of converting metal objects into bullion (for further re-use), which is documented in Old Assyrian texts (Veenhof 1995:863) and might have EBA antecedents. However, several types of gold and silver jewellery, including lobed hair-rings, tubular discoid beads and quadruple-spiralled beads spread across the Near and Middle East (fig.7.59, Aruz 2006; Rahmstorf 2011a; Tonussi 2007:180-221; Wilkinson 2014b:283-285, figs.6.47-6.48) do seem to have an Anatolian origin, if not of the objects themselves at least of the prototype. For instance, these artefacts occur in much larger proportions in Anatolia (often in the hundreds) than elsewhere, and often co-occur in the same levels at Troy, Poliochni and Eskiyapar. Moulds for the production of lobed hair-rings have also been found at Seyitömer V, Troy Ig-k (fig.7.59) and Akhisar (fig.7.50.1) but not further east; particularly significant is the Trojan example, dated c.2700-2600 cal BC (Bilgen 2015:fig.2035; Tonussi 2007:cat.nos.SM/1, 4). While most Anatolian and Near/Middle Eastern pieces are dated c.2400-2000 BC, hundreds of tubular disc beads from Karataş V cemetery are dated c.2600-2400 BC, earlier than all other well-stratified examples (cf. Tonussi 2007:190). Interestingly, outside Anatolia these objects are found only at main network hubs (Ur, Tell Brak, Kish and Mari, among others). Furthermore, their spatial distribution seems to highlight different main interregional routes towards the Caucasus, western Iran/Afghanistan, and Indus valley, similarly to the distribution of lapis lazuli objects (and tin?) in the inverse direction (cf. Rahmstorf 2011a).

Additional evidence for contacts is represented by two well-definable ceramic types characteristic of western/central Anatolian productions, the depa and the tankard, that appear at a number of sites in Cilicia, the Amuq region and along the Middle and Upper Euphrates after c.2400 BC (fig.7.60, Türkteki 2010:85-88, maps 2-3). In the most recent attempt at classifying these forms, Vasıf Şahoğlu recognises a series of separate typological groups that tend to have each a well-defined spatial distribution (2014). The pieces found east of the Taurus Mountains are, in terms of shape, closely related to productions at Kültepe and Gözlükule, although they may have been locally manufactured. The spread of these drinking cups in Upper Mesopotamia is paralleled by their contemporary spread in the western Aegean during the “Kastri/Lefkandi I” phase (section 7.2.1.2) and, although at present untested, is possibly associated with new forms of feasting and/or the introduction of new types of alcoholic beverages from Anatolia (Şahoğlu 2014:292).

7.2.4 Between Aegean and Levant

The earliest direct contacts between the Aegean and the Levant have been traditionally dated to the latest 3rd millennium, in connection with the introduction of the sail technology and with the consequent reduction of travel times and increased cargo capabilities (cf. Broodbank 2000:341-349). Among the reasons for this conceptual stance are, on the one hand, the lack of synthetic studies of the west-central Anatolian archaeological assemblages, and on the other the absence of excavated sites along the southern Anatolian coast between Gözlükule and Iasos (over 1,000km) and in northern Cyprus. However, the existence of an established sea-route connecting Aegean and Cilicia/Levant already in the early EBA has been already brought forwards in previous chapters concerning:

a) the introduction of metrology in the Aegean (c.2900-2750 cal BC, section 5.1.2);

b) the appearance of seal-stamped pottery in the Aegean (c.2700-2600 BC, section 5.2.2.4);

c) the circulation of Levantine stamp-cylinder seals (c.2400-2200 BC, section 5.2.3.2);

d) the circulation of Antitaurus and Cypriot copper in the southern Aegean (after c.2400 BC, sections 6.2.4-6.2.6).

This section aims at expanding this corpus of evidence, and explores certain categories of artefacts whose spatial distribution is essentially limited to coastal sites and thus hint at important episodes of cultural transmission via sea-routes rather than through the Anatolian land-bridge.

7.2.4.1 Bone pigment containers

This class of artefacts has already been studied in detail by Herman Genz (2003, 2015) and Lorenz Rahmstorf (2006b:58-62; 2010c:277-279), and will be here only briefly discussed with regards to the provenance of the type, the process of adoption and local production in Anatolia and the Aegean, and the existence of maritime contacts between Aegean and Levant. They are small (5-23cm in length) tubular objects made of animal bone, mostly with incised decoration, provided with bone/stone stoppers and containing blue or black pigments (Genz 2003:25-27). There are some 150 pieces recorded from 59 sites between northern Aegean and southern Levant, with a few examples as far west as Malta and as far east as the Caspian Sea (fig.7.61). The perceived value of their content is hinted at by their association with rich graves (esp. in the Cyclades and northern Syria) or elite/templar contexts (in southern Levant and eastern Aegean, Genz 2003:27-30). A detailed typological analysis revealed clear differences in shapes, decorations, and type of animal bones employed for their production, allowing to distinguish three broad regional manufacturing traditions located in northern Syria, the Levant and the Aegean (fig.7.61, Genz 2003:14-22). In particular, many of the Aegean specimens sport a cut-away spout at one of the tube extremities, a trait not found elsewhere. It can be assumed that, together with the containers themselves, also the pigments would have been locally manufactured, either by the same artisan or by a related workshop in the same place. This is confirmed by the dominance of blue pigment in the Aegean (azurite, possibly coming from Lavrion) and prevalence of black pigment (galena-based) in Levant/northern Syria (Genz 2003:25-26; Rahmstorf 2006b:60-61). However, these objects also share significant similarities in their manufacture across the whole area, to the point that individual pieces often cannot be attributed to specific regional traditions; this suggests a degree of cross-fertilisation in techniques, and possibly also the circulation of finished objects between different manufacturing areas. Aegean pieces show closer stylistic similarities with northern Levant/Syrian specimens than with pigment containers in southern Levant, which is likely due to closer spatial proximity and more intense interaction (Genz 2003:20-21; Rahmstorf 2006b:58).

The contextual dating of the pigment containers indicates that the earliest specimens were produced in Syro-Anatolia, where they first occur at Habuba Kabira, Qara Quzak, Tell Judeideh and Tell Sukas, all dated between the late 4th and earliest 3rd millennia (fig.7.62, Genz 2015:363). They then appear in southern Levant in the local EB III (c.2800-2500 BC) and in the Aegean during the Early Cycladic IIa (c.2700-2600 BC, Genz 2003:34-44). In absence of provenance analysis, it is not possible to understand to what degree Syrian pigment containers were exchanged in the Levant and Aegean prior to the start of local production. Arguably, local manufacture must have been stimulated by local demand, itself triggered by the exposure to the product; furthermore, local craftspeople must have seen the original objects before being able to reproduce them. It is thus feasible to assume that there must have been some northern Levantine/Syrian pieces reaching the Aegean and the southern Levant before adoption and adaption of the form took place in these areas.

7.2.4.2 Ivory objects

Ivory is obtained from elephant and hippopotamus tusks and, though zooarchaeological evidence is still scanty, during the 3rd millennium two main areas can be identified as potential habitats for these species in the Near East: one are the marshy areas of northern Levant, particularly near the Orontes river and the Amuq plain, the other is the lower Nile (fig.7.64, Krzyszkowska 1988:227-228; Moorey 1994:118-120). While ivory was worked already in pre-Dynastic Egypt, it first occurred in southern Levant at the end of the 4th millennium, then in northern Levant (figs.7.63-7.64); ivory started to become relatively common in Mesopotamia only from late ED III times onwards (c.2600-2400 BC, Moorey 1994:118-121). The earliest ivory in the Aegean is found in EM IIa (c.2700-2600 BC) contexts at Knossos, and is intriguingly a small segment of hippopotamus tusk that directly proves the arrival of un-worked ivory on Crete; the *floruit* of ivory production is however EM III/MM Ia (c.2200-1900 BC), when some 25-30 objects (mostly seals and figurines) are found in graves across the island (Krzyszkowska 2005:63). The motifs of the ivory seals are clearly Cretan and thus prove a local manufacture of these items, despite the fact that many betray familiarity with Near Eastern iconography (e.g. the “parading lions”) and adapt shapes of Near Eastern seals like apes, birds and flies (Krzyszkowska 2005:33; Rehak and Younger 1998:232-233).

In Anatolia, the only secure ivory piece is a cylinder seal found at Poliochni Yellow (fig.5.21.1), c.2300-2200 BC); there are further ten pieces (buttons and inlays) from contemporary Troy IIg found in Schliemann’s excavations (fig.7.64) and three more (a knife handle, two balance beams) from the same levels found by Blegen. The Trojan pieces have however never been studied by a specialist, and some of them may have been manufactured from bone or boar’s tusks. There are no documented ivories in central Anatolia, mainland Greece or the western Aegean islands during the 3rd millennium. While Olga Krzyszkowska argues for an Egyptian provenance of the Cretan ivory (2005:59), most of the non-Aegean parallels for locally-manufactured Cretan seals’ shapes and imagery (both in ivory and other materials) and imported seals in the Aegean seem to point to northern Levant and Syria (section 5.2.3; Aruz 2008:39-45), strongly suggesting that the origin of raw ivory may have indeed be sought there, rather than in Egypt. This is further confirmed by the iconography and shape of the Poliochni stamp-cylinder seal, a probable Levantine/Cilician imitation of an Upper Mesopotamian piece (cf. Kenna 1970). The circulation of worked and un-worked ivory in the Aegean ceases after MM Ib (c.1850-1800 BC, Krzyszkowska 2005:70-74), but it becomes however relatively common in central Anatolia during the early 2nd millennium, suggesting a shift in ivory exchange networks between EBA and MBA. This is witnessed by the retrieval of raw elephant tusks at Acemhöyük, and very elaborate finished products both in elephant and hippopotamus ivory at Acemhöyük, Kültepe, Alacahöyük, Eskiyapar, Ebla and Alalakh (fig.7.64, Bourgeois 1992; Krzyszkowska 1988:230; Moorey 1994:117).

7.2.4.3 Additional evidence

While not investigated here in detail, other evidence can be offered in support of the existence of the southern Anatolian sea route: it is for instance corroborated by the arrival of Egyptian stone vessels at Knossos and Ayia Triada, possibly in contexts as early as EM IIb (c.2400-2200 BC), likely through the Levant (fig.7.65, Bevan 2004:113-120; 2007:94-96). As already seen in EBA Anatolia for other categories of goods, it is interesting to note that, shortly after the arrival of Egyptian stone vessels in Crete, local craftspeople start producing foreign forms with local materials and local styles (Bevan 2007:96-99). Other imports (together with evidence of local adaptation of foreign forms) are the scarab seals found in significant numbers in Crete during the EM III/MM Ia (c.2100-1900 BC), at Lenda, Gournes and Platanos (fig.7.66, Krzyszkowska 2005:73-74). Single finds (fig.7.66) are also a possible Levantine ingot fragment at Poros-Katsambas EM IIa (c.2700-2600 BC, Doonan R et al.2007:105-106), an Egyptian/“Egyptianizing” seal from Asine (Aruz 2008:19), another Egyptian button seal from Gözlükule (c.2400-1950 BC, Goldman 1956:234), a Syrian silver cylinder seal from Mochlos EM II/III (c.2600-2000 BC, Aruz 2008:40), and an imported Palestinian flask in the latest EBA levels at Tiryns (c.2200-2000 BC, Maran 2007:17).

The Philia phase in Cyprus (c.2450-2250 BC) also provides a very good case for the intensification of interactions between Aegean, southern Anatolia and the northern Levantine coast in the late EBA. In this horizon, the insular communities witness radical changes connected to most spheres of social life that indicate a phase of intense interaction with surrounding regions, possibly even the (organised?) movement of Anatolian groups on the island (Webb and Frankel 2007, 2011, 2013). These include the appearance of elite burials and multi-roomed stone and mudbrick architecture, the systematic exploitation of the vast copper deposits, the introduction of plough, backed sickle blades, cattle and donkey, and the adoption of new pottery and textile production technologies. These broader changes are also matched by the circulation of a number of artefacts that, on typological grounds, betray a southern Anatolian origin or influence: poker-butted and rat-tanged spearheads, lobed hair-rings, toggle pins, leaf-shaped razors, red-slipped wares (Webb and Frankel 2007:199; Webb et al.2006). Lead isotope analysis on metal objects further shows the occurrence of Cypriot artefacts produced with copper from Kythnos, Seriphos, Lavrion (western Aegean), Bolkardağ (central Anatolia) and Ergani Maden (south-eastern Anatolia) in significant quantities (Stos-Gale and Gale 2010; Webb et al.2006). Intriguingly, a few Cretan metal artefacts from Ayia Photia (early EBA) and the Mesara plain (late EBA) have lead isotope fingerprints that are consistent with Cypriot copper ores (Stos-Gale and Macdonald 1991:267).

7.2.4.4 Aegean and Anatolian products in the east

Evidence for Aegean and Anatolian goods circulating in the opposite (west-east) direction is admittedly much scarcer. Arguably, a major share of the exchanges within the southern Anatolian maritime route would have likely been composed of copper, silver and gold coming from areas close to the Aegean and Anatolian shores, in particular from Lavrion, Siphnos, the Troad, the İzmir region and the Taurus Mountains (section 6.2.1). It is thus regrettable that so little has been done in the Levant in terms of metal provenance analysis, and that the few available studies only focused on copper-based artefacts (cf. Hauptmann et al.1999; Philip et al.2003). Even with the general dearth of evidence, it is thus interesting that very small quantities of copper from Cyprus and the Bolkardağ occur in Jordan at Pella already around 3000-2800 BC (fig.7.67, Philip et al.2003:87). These results lend more credibility to an early analysis on a hoard of Egyptian golden objects, whose results suggested its origin as the Sardis gold placer (fig.7.67, Young 1972:11-13), and to the find of a clay pitcher in a 4th Dynasty mastaba at Giza (c.2600-2500 BC), that has precise parallels in Gözlükule "EB II" levels (Mellink 1963:111). A further point of contact is represented by a pierced-butt flat axe found at Khirbet al Batrawi (c.2700-2500 BC, Nigro 2014:43), that has close parallels in pieces from the Aegean and the Anatolian coast. Additional evidence can be brought forwards with regards to the western leg of the maritime route, that stretches from the Aegean basin to Cilicia: this includes four spool weights found in Gözlükule "EB II" levels (c.2600-2400 BC, section 5.1.1), on top of the already-mentioned Lavrion/Siphnos/Kythnos copper appearing in late EBA Cyprus (c.2400-2100 BC, section 6.2.4), and local re-elaborations of the duck-shaped askoi in Cyprus (c.2200-2000 BC, section 7.2.1.1).

7.3 Discussion

The case studies discussed above suggest that our ability to detect and quantify similarity and difference in the archaeological assemblages (and thus to infer about the nature of different exchange networks) is to some extent a matter of data quality. Better, denser and more varied datasets provide the ability to further distinguish between smaller interaction networks (or clusters within these, section 2.2) and to identify the areas where different networks merged and transitioned. For instance, the analysis of interaction within the Aegean basin (where a much higher number of well-excavated sites and synthetic studies are available) allows us to further distinguish between various sub-networks based on the different distribution of a large range of artefacts. These distinguish the Cyclades, the eastern Greek mainland/Euboea, Crete, the central-eastern Aegean coast and the north-eastern Aegean coast. Such regional linkage is also detectable within datasets pertaining to single categories of evidence: in section 7.1 the analysis of pottery (on c.900 sites) allowed Sarı to identify a much larger number of different regional ceramic-manufacturing traditions (arguably, a reflection of social networks of finished products but also of technological know-how) than the analysis of funerary customs (c.100 sites), figurines (c.80 sites) or loomweights (c.30 sites).

Thus, while the repetition of similar spatial patterning in different classes of archaeological evidence seems to represent real socio-cultural processes, the spatial boundaries of individual networks are difficult to grasp in detail, and likely denser and better-quality data would not solve the problem but instead increase the number of interlocking clusters that can be recognised. Connected with the ability of quantifying similarity/difference is also the realisation that interaction between two different areas often entails a process of both adaptation and imitation of foreign elements at the local level. As already discussed in section 2.3.4, adaptation can be conceived as a process in which artefacts, technologies or behaviours are modified to better fit local tastes while retaining the general concept. Imitation, on the other side, is the attempt to reproduce non-local goods to make them undistinguishable from real imported artefacts, especially within the sphere of luxury products and elite ideology. These phenomena are sometimes difficult to tell apart, and are even more so difficult to recognise in the Anatolian dataset, given the general scarcity of analyses on the archaeological contexts and manufacturing technologies. Comparison with better-understood assemblages outside Anatolia however suggests that both processes are probably widespread across most classes of the evidence presented in the dissertation.

As already discussed in section 2.2, we can describe a social network as composed of a specific group of individuals that share a higher degree of cultural similarity among them than with surrounding groups, and that exchange a coherent set of goods and information which are both desirable and acceptable in their social milieu. In this light, the obvious overlapping noticed in the spatial distribution of different sets of artefacts, practices and behaviours within a specific area (e.g. the Afyon region, or the Büyük Menderes-Gediz triangle, or the central Aegean basin) can be read as the archaeological reflection of individual social networks active in the region. Even if the archaeological datasets generally have low chronological accuracy, most of these networks seem to have remained in place for at least a few hundred years, and in some cases there is evidence of their persistence across more than a millennium, indicating the reproduction of similar mechanisms of interaction across many successive generations. It will be discussed in more detail in section 8.1 how (particularly at smaller scales) natural landscapes may have affected the creation of relatively stable network structures, not only because they funnel human movement along preferential corridors, but also because they affect (in the medium/long term) the construction of group identities at the supra-settlement level, promoting higher cultural similarity among communities living in the same environment and thus more intense interaction between them. However, different case studies quite clearly show that these social networks were not closed systems, they presented fuzzy boundaries, and their individual members partook in various degrees to other parallel networks, a process particularly evident in communities that lived at the interface between different environmental niches (e.g. the eastern Aegean seaboard, or the Porsuk-Sakarya plains).

Building on results from previous chapters, chapter 7 also provided evidence regarding the degree of specialisation in production and circulation of goods. While there are activities that, during the EBA, seem mostly confined to domestic contexts and are performed in concomitance with other chores, thus possibly part-time, small-scale and low-intensity (e.g. weaving, terracotta figurine manufacture), there are others for which higher degrees of specialisation can be suggested (e.g. pottery manufacture). While less understood in detail, the occurrence of small cosmetic containers that were also produced in Anatolia and the Aegean suggests some degree of specialisation in their manufacture (cf. Cultraro 2012). Intriguingly, the appearance of monumental structures at most medium-large settlements (e.g. public quarters, fortification walls) also hints at the existence of builders with both considerable technical skills and the ability to coordinate a large workforce. This is further corroborated by the precise reproduction of architectural elements (e.g. the horseshoe-shaped bastions in the central Aegean, the Troy IIc-Kanlıgeçit KG 2b "citadels") in different areas, a possible hint for the circulation of these specialists. However, metalworking emerges again as the activity with the highest level of specialisation; sections 6.2.2, 6.2.3 and 6.2.6 have already outlined the complexity involved in the different (multi-tiered) stages of extraction and production, and the possibility that metallurgical work might have been transmitted from one generation to the other. Various case studies in this chapter have further demonstrated the existence of very sophisticated metal artefacts, whose manufacture involved techniques (e.g. inlay, lost wax, filigree, open-work, metal plating) that only full-time smiths would have been able to master. Indeed, with the available evidence metal assemblages from Alacahöyük and related sites do represent the apogee of metallurgical craft in Bronze Age Anatolia.

More difficult is to assess the existence of exchange specialists (i.e. traders), who can directly be recognised only by the occurrence of balances and balance weights (section 5.1). This notwithstanding, there is abundant indirect evidence for their presence in Anatolia. For instance, the circulation of sophisticated luxury goods seems very much directional, from centre to centre and skipping intervening smaller sites, a pattern that is unlikely to have occurred without the interference of professional intermediaries. Additionally, while there is evidence for long-distance exchanges involving mainland Anatolia already in the Neolithic/Chalcolithic periods, this dissertation has shown very clearly the intensification of these exchanges throughout the 3rd millennium, regarding not only the quantity of goods exchanged, but also the range of products and behaviours. During the EBA, they also considerably expand in scale (some artefacts may have circulated for hundreds if not thousands of kilometres) and seem to become more structured as well, with the emergence of centres controlling access to major routes. Lastly, the development/introduction of several new transport carriers such as longboats, donkeys and wheeled carts (expensive to acquire and to maintain, fig.3.8), also hints at the presence of exchange specialists that would have had both the financial means and the needs to employ them, often coordinating small groups of travellers (15-20 people for longboats, potentially larger for donkey caravans).

The spatial distribution of a large number of goods, technologies and behaviours pertaining to larger-scale networks (presented in chapters 5-7) has further provided some insight into the physical structure that would have allowed the easier circulation of goods and ideas across the social networks. Several natural trunk routes, already suggested through landscape analysis and collation of evidence for later road use (section 3.2), clearly emerge from mapping the material flows (fig.7.68). It is important to note that these belong only to the upper echelon of the EBA route network, and represent only some of the major highways (section 2.1.2.1 for the concept). As previously suggested, a finer understanding of the local and regional route/road systems would only be possible through targeted survey projects that are at present lacking in Turkey. A further important issue regarding the structure of these networks is that episodes of interaction unfolding at increasingly larger spatial scales seem to be regulated by different mechanisms. In particular, products and behaviours circulating within the interregional networks (arguably mostly associated with the elite sphere) seem to essentially occur within medium-large sized settlements that act as hubs in the system, and are instead largely absent at smaller villages or sites away from the main trunk routes.

Chapter 7 has offered further evidence to date the establishment of stable contacts with Upper Mesopotamia and the Levant much earlier than commonly accepted, and the existence of two separate (though partially overlapping) exchange networks, one mainly following maritime routes, the other essentially involving overland routes (fig.7.69). While few provenance analyses on Levantine/Upper Mesopotamian metals are available, the existence of these routes is, in all likelihood, connected with the desire of the Near Eastern lowlands to tap into the vast polymetallic resources of both inland Anatolia and the Aegean (section 6.2.1). Concerning contacts between central Anatolia and Upper Mesopotamia, the earliest evidence is represented by the presence of central Anatolian obsidian in Cilicia and the Levant in Neolithic times, the single Late Ubaid sealing from Güvercinkayası, and the small amounts of Taurus (Bolkardağ) copper at several late 4th millennium sites. This is followed by the introduction of both sealing practices and metrology in Anatolia at least since 2900-2750 cal BC (at Çukuriçi Höyük IV-III and Poliochni Blue) and the appearance of a Mesopotamian bulla in Demircihöyük F_2 (c.2800 cal BC). The appearance of tin bronzes in central and western Anatolia around the same time is more problematic to assess, given the controversy regarding its possible origin. The earliest "Syrian" bottles probably reach the central Anatolian plateau at c.2700-2600 BC, however this is only hinted at by a group of local metal copies (at Demircihöyük, Küçükhöyük and Polatlı). Intensification of contacts is noticeable after c.2500-2400 BC, with a wide range of Upper Mesopotamia/"Mesopotamian zing" artefacts and technologies reaching as far as eastern Thrace and the Aegean basin and Anatolian/"Anatolianizing" goods circulating in the opposite direction. While contacts between central Anatolia and Upper Mesopotamia further intensify during the early 2nd millennium (cf. Barjamovic 2011; Palmisano 2015) and bring the MBA "city-states" fully into the Near Eastern arena, western Anatolia drops out of this network after c.2200 BC and re-orients itself towards the Aegean world (Massa and Şahoğlu 2015; Şahoğlu 2005).

Contacts between the Aegean and the Levant via the southern Anatolian coast, on the other hand, are witnessed by the westward spread of both metrology and sealing practices at c.2900-2750 cal BC (again, at Çukuriçi Höyük IV-III and Poliochni Blue). The units of measure and shapes of the stone weight and the occurrence of seal-stamped pottery along this route clearly indicate that the Anatolian land-bridge was not involved in this process. At a later date (EC IIa/EM IIa, c.2700-2400 BC), a few Levantine products such as bone pigment containers, raw ivory, and Egyptian stone vessels make their first appearance in the Cyclades and Crete, followed by a significant process of re-elaboration of shapes that are further circulated in the area. During this horizon there is also the earliest evidence for a few Aegean/"Aegeanizing" products reaching Cilicia and the southern Levant, in the form of spool weights (at Gözlükule), pierced-butt flat axes (at Khirbet al Batrawi), Sardis gold and a Cilician pitcher in Egypt. The late 3rd millennium sees the increase of Levantine products in the Aegean, particularly concentrated on Crete, whose communities witness a gradual process of increasing social complexity that will culminate in the Palatial period (at c.1900 BC, Legarra-Herrero 2011; Tomkins and Schoep 2010). In contrast the Cyclades, one of the main cultural cores of the Aegean during most of the EBA, seem to lose their importance as key nodes in the maritime networks and see the abandonment of most of the main centres (Wiener 2014:6-7). To some extent, the shift is possibly caused by the introduction of sail technology and better seafaring skills, which allowed faster and more direct sea voyages and placed Crete at the centre of the eastern Mediterranean network (Broodbank 2013:353-355; Sherratt and Sherratt 1998:339).

These considerations however raise the question of whether, during the EBA, individual traders undertook direct journeys from the Levant or Mesopotamia to the Aegean and western Anatolia or vice versa. In this sense, the identification of possible EBA routes and the calculation of travel times employing different transportation means discussed in chapter 3 provide a useful guide (fig.7.70). The maritime route from mainland Greece (Aegina) to Cilicia (Gözlükule) covered approximately 1,400km, with a further 350km to reach the central Levantine coast at Byblos. With a longboat, arguably the preferred means for long-distance maritime travel for most of the EBA, the return Aegina-Byblos trip would have lasted c.104-132 days, considering reasonably favourable weather conditions and without intermediate stops (that would however been necessary: to replenish supplies, to maintain trading partnerships, etc.). Even if these figures indicate that it would not have been impossible for a skilled group of seafarers to make the return trip in a single season (April-September), they also suggest that single groups of traders would have not customarily travelled the whole route. It is more probable that different interlacing sub-networks may have operated along the southern Anatolian coast (the Antalya plain being an obvious region to host maritime hubs), though the complete lack of excavated sites prevents any detailed hypotheses. Intriguingly, with a sailboat (introduced in the late 3rd millennium) the journey would have been considerably shorter (66-86 days), corroborating the idea that this innovation would have made the Aegean and the Levant much closer.

With regards to the overland routes, a direct journey from Troy to Kültepe measures c.950km (fig.7.69), approximately the same distance travelled by Assyrian merchants in the early 2nd millennium along the Kültepe-Assur route. A human porter would have approximately taken 80-94 days for a return trip, while donkey caravans significantly less (62-76 days), although it has to be noted that there is no positive evidence for donkey beyond the central plateau. Both the Old Assyrian accounts and the rough time calculations suggest that the trip would have been possible, although the people that undertook such enterprises were in all likelihood specialist traders.

Chapter 8: back to the beginning

This chapter re-evaluates my initial research questions in the light of the above results. Three main lines of enquiry are followed: section 8.1 returns to the importance of both natural and cultural landscapes in shaping human interaction. Section 8.2 offers a more informed sketch of the mechanisms of EBA Anatolian exchange, re-assessing what was circulated, the (collective) identity of the travellers, and the possible dynamics in operation at different scales. Section 8.3 moves on to provide a diachronic model of the development of interregional networks over the course of the 3rd millennium, linking their expansion with the rise of stable elites and an intensification in the organisational complexity behind metal production and distribution. The chapter thereby draws together a range of thematic comments, leaving final concluding remarks and discussion of future opportunities to chapter 9.

8.1 Landscapes of interaction

While travel would have been relatively unconstrained within large plains (at least from a topographic point of view), orographic chains and large rivers undoubtedly constituted significant barriers to movement, since they were pierced by a relatively small number of mountain passes and fords that would have funnelled movement along certain pinch points. Even though river crossings may have shifted across time, and local environmental changes did occur in the medium-long term (e.g. aridification, creation of swamps, coastal progradation), both mountains and water courses remained relatively stable throughout the mid/late Holocene, favouring a certain degree of continuity in the use of major natural routes. Additionally, most large sites seem to have witnessed an almost uninterrupted occupation for millennia, encouraging the persistence of similar network structures at least at the regional and supra-regional scale. The foundation of some major centres (like Hattuša and Büklükkale in the latest EBA, Šapinuwa in the LBA, Byzantium in the Iron Age), or their disappearance due to human/environmental factors (e.g. Kültepe in the LBA, Tavium in the late Byzantine period), would have certainly altered the wider-scale networks to a larger or lesser extent. This notwithstanding, as convincingly argued by David French (1993), new centres were mostly founded at locations that were already well-connected to major routes, suggesting that their appearance would have impacted more on the intensity of traffic along certain arteries, but less on the physical structure of the networks. However, one should imagine that local networks might have experienced a higher rate of change than the interregional ones, since all better-published survey projects reveal significant shifts in location of small/medium-sized settlements across time.

Chapter 3 has also suggested that, even in the absence of archaeological evidence for Anatolian (dirt)roads, these must have existed during the EBA. For instance, the large volumes of detectable interaction would have prompted the establishment of more-or-less formalised sets of paths between one place and another, reproduced across time by a large number of travellers, and whose existence would have been acknowledged and transmitted down from one generation to the other. The passage of humans, but especially of pack animals and wheeled carts would have favoured the creation of beaten tracks, distinguishable from the surrounding terrain cover and thus attracting further traffic. Early 2nd millennium texts indicate that some of the main tracks or roads were equipped with inns, way stations, bridges, ferry services and sometimes guards. In other words, they were already highways that would have attracted travellers engaged in longer journeys, including traders, soldiers and administrators. There is extensive evidence (sections 3.2, 3.5) that some of these highways persisted for several millennia, and that most of these also connected EBA centres and indeed some of the Neolithic/Chalcolithic ones as well (fig.3.25), suggesting a long process of road genesis, maintenance and usage. Even though the Anatolian context is particularly conducive to the diachronic persistence of roads, a similar pattern has also been observed in other regions, for instance in Britain where most of the main Roman centres survived until present day, together with the main communication arteries (fig.8.1, Hindle 1976; Reynolds and Langlands 2011; Perring and Pitts 2013).

An element that cannot be fully grasped in the archaeological record, and thus not properly documented in this dissertation, is the role of landscapes in the creation of collective identity. I have argued in section 2.1.2.1 that groups with a higher degree of cultural similarity (including similar socio-economic structures, shared systems of value) witness more intense and frequent interaction between them than with groups more culturally distant. In this sense, natural and cultural landscapes may have influenced the personal and collective identity of human groups (thus their similarity) on a great number of levels. For instance, different ecological niches certainly affected the socio-economic strategies of the communities living within them (therefore, to some extent, their socio-political structure), favouring or hampering reliance on agriculture, animal grazing, hunting or exploitation of natural resources in different environments. The ability to store agricultural surplus (with its possible socio-political consequences) would have been also in part dependent on land fertility, while the willingness to implement a tighter control over storage strategies might have been in part triggered by the wider environment’s susceptibility to drought. Furthermore, vernacular architecture would have been affected by climate (in particular weather, temperature and winds), e.g. regarding roof construction (pitched roofs in wetter climates, flat roofs in drier ones), the amount of open spaces (courtyards, windows, roof openings), the number and efficiency of heating installations, and the materials employed in house construction (more or less insulating). These elements also influenced the general settlement layout: agglutinated buildings would have been possible only with flat roofs, while presence of public squares would have been a less prominent feature in cold climates. Interaction with and exploitation of particular natural settings would have favoured the development of some skill sets rather than others, such as fishing, driving a sheep herd to the summer pasture, or quarrying metal ore from the mountainside.

All of these elements (how we live, how we build our houses, what we make for a living, the character of the community we live in) do play an important role in the construction of personal and collective identities today, and there is no reason to think that it would have been different in the past. And since the surrounding environment influenced the collective identity of people living in it, communities sharing the same landscape would have probably felt closer (or more similar) to each other than with communities living in different contexts, and would have shared similar systems of values, including what sort of goods and behaviours were socially acceptable and desirable. Thus, relatively stable natural and cultural landscapes may have contributed to maintain social networks functioning within the same ecological niches, across time.

Another important element of continuity is highlighted by the distributional analysis of large numbers of diverse goods and information, which seems in many cases to reveal the recurrence of similar spatial boundaries, i.e. the persistent cultural frontiers discussed in section 2.1.2.2. In a sense, these areas acted like watersheds between largely-separated exchange systems. As with other categories of analysis, the identification of these frontiers is to some extent hampered by data quality and density. This notwithstanding, at least three major persistent cultural frontiers can be clearly defined (fig.8.2): the imposing Taurus and Antitaurus Mountains, partly responsible for the isolation of central Anatolian communities from the Near Eastern world up until the early 3rd millennium, are the most prominent example. The second is the edge between the western Anatolian highlands and the central plateau, particularly in the southern part where mountain chains are higher. Even though archaeological evidence is sparser here, and caution should be applied, this frontier is also marked by the relatively abrupt change in climate, vegetation and rainfall patterns between the Konya plain and the Lake District (cf. figs.1.2, 1.4, 1.5). The third is instead represented by the fault line between the Aegean coast and the western Anatolian highlands, which often abruptly rise only a few kilometres from the shore. This barrier is however interrupted by the Gediz and Büyük Menderes river valleys, two major transversal routes that connect the coast with the interior. Other possible frontiers can only be suggested based on the topography, although virtually nothing is known from an archaeological perspective: these include the Pontic Mountains in the north and the Taurus Mountains in the south, which would have likely acted as prominent barriers between coastal and inland communities.

In contrast, several permeable interfaces also clearly emerge from the spatial distribution of archaeological materials, i.e. areas that witnessed a significant degree of intermixture of elements from different exchange networks (fig.8.2). The eastern Aegean seaboard is certainly the best-documented example: here, coastal communities shared a large range of cultural traits with neighbouring areas. The analyses of previous chapters have highlighted two sub-regions where interaction between different systems is particularly intense. One is the central-eastern Aegean coast between Limantepe and Iasos, at the conjunction between the "Cycladic corridor" and the Büyük Menderes valley, where western Aegean, inland Anatolian and Cretan elements co-exist at several sites. The other is the area encompassing the Troad and north-eastern Aegean islands, where western Aegean, Thracian, inland Anatolian and Black Sea networks merge. A further permeable interface can be detected within the Porsuk-Sakarya plains, a region that seems culturally connected with both the Marmara basin (and Thrace beyond it), north-western Anatolia and the northern central plateau. These interfaces are the location of recognisable EBA gateways, i.e. sites characterised by the presence of a large typological range of goods and innovations pertaining to different geographical areas. With regards to overland networks, it can be suggested that Küllüoba, and even more so Demircihöyük, acted as gateways between different networks active in the Marmara basin, north-western Anatolia, the Afyon region and the northern part of the central plateau. At the eastern limit of the study area, Kültepe clearly posed as the main gateway between central Anatolia and Upper Mesopotamia, thanks to its strategic location at the intersection of numerous routes across the Antitaurus Mountains and the role of funnel exercised by the Kayseri plain (cf. Barjamovic 2008:97-98).

On the other hand, several western Anatolian coastal sites seem to have been very successful in exploiting their position at the interface between land and sea, and thus between maritime and overland networks. The occurrence of several pottery types, Melian and EGD/ND obsidian, tin bronzes, metal objects as well as shared metrological and administrative practices between inland Anatolia and the Aegean (section 7.2.4) clearly suggests the importance of sites like Troy, Poliochni, Thermi, Limantepe, Çukuriçi Höyük and Iasos as gateways between these two worlds. Troy, in particular, emerges as the most inter-connected settlement in Anatolia and the Aegean: amber from the Baltic, bone plaques from the central Mediterranean, lapis lazuli from Afghanistan, carnelian from the Indus Valley, ivory from Syria, funerary practices from the northern Black Sea, faience from the Levant all bear witness to its role at the centre of interregional networks from all directions (cf. Korfmann 2001).

Although no comparable works exist on earlier or later periods that directly discuss the existence of such permeable interfaces and persistent frontiers, the distribution of several features shows the recurrence of similar spatial patterns across time, from the Neolithic up to the Roman period, highlighting in particular the major fault lines coast/highlands and highlands/plateau, and the role of the Gediz and Büyük Menderes as major corridors between the Aegean coast and inland Anatolia (figs.8.3-8.9). While, as already mentioned, these trends may be in part an analytical bias related to low intensity of investigation of certain areas, the fact that they occur in different datasets compiled by different researchers and across such a temporal span strengthens the hypothesis that topography did indeed consistently influence movement (hence interaction) throughout Anatolian history.

Furthermore, the increase of settlement densities in all major plains across the EBA and the development of lowland societies from village-based communities to small territorial polities (section 1.5) likely had an effect on overland movement, making interaction more controlled at least beyond the valley-system level. In absence of textual evidence, it can only be hypothesised that a journey through populated lands would have entailed a significant amount of negotiation, not only to gain rights of passage, but also to get access to shelter, water and food. With journeys bringing travellers beyond their normal sphere of interaction, it would have probably been difficult to rely exclusively on social solidarity networks (through acquaintances, relatives, etc.), and possibly longer-distance travels would have needed to go through more formalised institutions as well (village elders, leaders in major centres). MBA texts depict a situation in which official treaties were regulating access to specific locations and forbidding it to particular categories of travellers (e.g. Eblaite merchants), and where merchandise and transit over bridges/ferries were taxed by central authorities (Barjamovic 2011). While this framework should not necessarily be retrojected to the EBA context, there are hints that some forms of control might have been exercised over the main routes, particularly in correspondence to the topographic funnels, i.e. valley entrances, river crossings and mountain passes (cf. figs.1.18, 3.14, 4.12).

We know less about maritime routes, and sea-borne travel was probably less constrained than overland movement; this notwithstanding, some sort of control might have been exercised by major harbour centres, particularly along funnels created by the position of emerged land and the direction of prevailing winds/currents. This seems the case of Troy, strategically located at the entrance of the Dardanelles Straits, in what would have been (during the EBA) a deep bay sheltered from the strong north-east/south-west winds and currents (fig.8.11) on its way to the rich resources of the Black Sea (gold and copper among others). Although not documented in the archaeological record, one should also imagine that travellers would have needed to take into account the perils created by groups not affiliated with palatial powers: brigands on land are mentioned in MBA texts (Barjamovic 2011:26-27), while in the Aegean elements loosely labelled as “pirates” or “raiders” are known to have been a thorn in the side of all maritime powers (Broodbank 2013:466, 552; Wiener 2013:164-166).

What seems to emerge from these observations is that control over trade routes and over access to imported goods may have been in itself an important resource, one for which competition could have arisen.

8.2 EBA exchange networks

Analyses in previous chapters have shown that, while it is relatively easy to trace the circulation of individual cultural features, more problematic is to understand their mutual correlation, and to what extent their co-existence in a specific site/area is the reflection of their affiliation to the same social network. This is not a problem inherent to archaeological contexts alone, since it has been stressed also by sociologists working on modern data (thus with much more detailed datasets): while it can be recognised that individual traits affiliated to a cultural system (i.e. a social network) are interconnected and likely influencing each other, it remains much more difficult to formally assess this relationship (Axelrod 1997:206). For the EBA Anatolian dataset, this stems from a large number of factors: the spatial patchiness of the archaeological record, the fragmentary nature of the archaeological record itself and its scarce ability to reach the personal identity of the individuals participating in these networks, and the limited range of elements selected for analysis. Another difficulty lies in the task of describing, analytically but also visually (e.g. via maps), different networks at increasing spatial scales and in different periods, since the analytical windows of analysis are by necessity fixed, but actual social phenomena are instead embedded in a dynamic spatial-temporal continuum. Furthermore, our inability to reconstruct the dense network of pathways at the local level hampers our ability to conceive and represent networks in real-world landscapes: social systems, be as they may communities, territorial polities or state entities, are better represented as an ensemble of nodes and roads, rather than shaded areas on a map (Smith M 2005, cf. fig.8.12 for a modern example). But above all, there is an objective difficulty in assessing cultural similarity and difference across varying spatial scales: between different artefacts, between single-type assemblages from different sites, between archaeological assemblages from different sites, between archaeological assemblages from different regions, and so on. From an analytical perspective, “similarity” and “difference” are not intrinsic qualities of an object/behaviour, i.e. are not categories that can be described in isolation, but that emerge from comparison with other objects/behaviours, either in contemporary contexts elsewhere, or in the same place but at different times. If anything, this dissertation has highlighted the need for more sophisticated frameworks to understand this, with tools that have the ability to transcend fixed spatial and temporal scales of analysis and to combine different elements at the same time.

Individual networks and main routes that can be detected from archaeological evidence have already been sketched in chapters 6 and 7, but it is at present difficult to produce a coherent overview, and will thus not be discussed here in further detail. The following section however aims at providing a synthetic understanding of what the archaeological evidence so far collected can tell us regarding the collective identity of the EBA travellers, what circulated in EBA Anatolia, and sketch (some of) the mechanisms of interaction active at different spatial scales.

8.2.1 Who travels

It can be argued that, in light of the available EBA transport technology, the costs involved in the acquisition/upkeep of faster transport means, the logistics required for longer journeys and the time constraints imposed by agricultural chores, most people living in sedentary communities would have rarely travelled beyond a 50-100km radius from their homes, and no more than 5-10km (one-two hours walk) in their daily lives (chapter 3).[57] This situation would have produced very frequent, small-range, multi-directional, non-organised movements of individuals and small parties that largely operated outside the control of central authorities, in what can be termed a "Brownian motion" (cf. Horden and Purcell 2000:143 for the concept). In the absence of projects (targeted surveys, excavation of nearby contemporary sites) aimed at revealing interaction at such a small scale, it is difficult to grasp the impact that these Brownian movements would have had on shaping the social, cultural and economic dynamics of the EBA Anatolian communities. Yet, it can be suggested that they would have composed the vast majority of all interaction episodes occurring at any one time in a given region, and that these small-scale social networks created the backbone structure onto which larger systems may have latched on.

Only a relatively small group of individuals would have more-or-less customarily travelled beyond the boundaries of their community: above all professional traders, whose existence is suggested by the appearance of stone weights and scales since the early 3rd millennium (section 5.1) and by the large inventory of the Dokos' shipwreck (c.2200 BC, section 3.1.4). There is also indirect evidence for the movement of craftspeople: builders for instance, whose presence is suggested by strong similarities in monumental architecture across large areas between the Aegean and Anatolia (cf. in particular the similarities between Troy IIc and Kanlıgeçit KG2 "citadels", and the Aegean horseshoe-shaped bastions, sections 7.2.1.1 and 7.2.2.1). The circulation of specialised potters is instead suggested by the quick westward spread of the

[57] This figure could have been however much higher for more mobile communities, as e.g. Transcaucasian groups (cf. also Wilkinson 2014a).

potter's wheel technology (section 5.3.5), but also by the occurrence of peculiar ceramic wares and shapes outside their supposed area of origin, whose local manufacture is only recognisable through fabric analysis (cf. "Cycladic" pottery at Ayia Photia on Crete and "Anatolian" red-slipped wares at Kanlıgeçit in eastern Thrace, sections 7.2.1.3, 7.2.2.1). The sudden popularity of crescent-shaped weights in the latest EBA is also possibly the result of movement of specialised weavers (section 7.1.2.3). Lastly, even though more difficult to grasp, the extensive circulation of metalworkers may be responsible for the quick spread of several metallurgical technologies across Anatolia. With the exclusion of traders, it is not necessary to imagine specialists travelling long distances, and a large portion of all technological transfers documented in this dissertation may have occurred through small-range movements within the context of craft apprenticeship (cf. Wilkinson 2014a).

The movement of more substantial groups of people is also a strong possibility for EBA Anatolia; however, a detailed and substantiated discussion on this issue would require dedicated analyses and much better datasets than those my dissertation can provide. In absence of multivariate, contextual intra-settlement studies, it is hard to prove the presence of foreigners at any one site, let alone their role in the settlement and their relationship with the locals. Furthermore, the scarcity of inter-site analysis of dietary habits, architecture, burial customs, artefact typologies and ritual behaviours, successful in other areas of the Near East to spot movements of large organised groups, hampers our ability to produce an accurate picture for EBA Anatolia. Nonetheless, it should be mentioned that the presence of small (100-200 people?), culturally-intrusive groups, variously labelled as "emporia" or "colonies", has been suggested for a number of EBA sites in the Aegean and Thrace, including Kanlıgeçit, Kastri, Ayia Photia, and Manika (Betancourt 2008; Kouka 2008; Özdoğan and Parzinger 2012:273; Şahoğlu 2005:346, 352-354). Their identification is based on the co-existence of elements such as higher-than-average amounts of imported goods, the local manufacture of "foreign" products and the presence of architectural and/or funerary practices that seem alien to the local traditions. In all cases, it seems that that these groups were established at important network nodes; their existence was thus likely related to trading activities. It is however difficult to understand to what extent the material evidence at these sites simply reflects intense interaction with areas farther away (resulting in the emulation/adaption of foreign practices), or instead the actual settlement of people in the form of individual craftspeople, organised groups of traders, or the migration of small cohesive communities alien to the local cultural milieu. Better-studied cases in the Near East (e.g. the Late Uruk and Old Assyrian "colonies") show a complex and dynamic picture in which the intrusive groups behaved rather differently in each context, according to the personal and collective identity of the stakeholders (e.g. in terms of gender, status, profession, origin), their aims, and their relations with the locals and with their homelands (Stein 2005, 2008).

An even thornier issue is whether large, organised migrations did occur in Anatolia during the EBA. Even though the "Luwian invasion" has long been a favoured factor to explain the socio-political disruption witnessed during in late 3rd millennium Anatolia, the lack of detectable changes in material culture has recently prompted alternative models that read social tension as a reflection of the process towards the formation of territorial polities (Efe 2003:93; Özdoğan 2011:25), likely within the context of environmental stress caused by severe drought spells between c.2200-1900 cal BC (Massa 2014a; Massa and Şahoğlu 2015). This notwithstanding, several phenomena at the periphery of central Anatolia, such as the Early Transcaucasian expansion and the Philia horizon in Cyprus, seem to have entailed some form of migration witnessed by radical and often abrupt changes in several spheres of material culture and over a significant area (section 7.2.4.3). In particular, one should engage with the possibility that the area within the Kızılırmak bend might have been tangentially affected by the Early Transcaucasian phenomenon, even though early EBA settlements in the area are scantily investigated and the excavators of Çadır Höyük (at present the only site that can potentially provide answers to this issue) are rightly very cautious in bringing forward any conclusion (cf. Steadman et al.2008, 2013).

8.2.2 What travels

The analyses presented throughout the dissertation have demonstrated the large variety of goods and information that were exchanged in different contexts and through different networks: commodities (in raw, semi-finished and finished form), technological expertise, practices and behaviours. And yet, it should be understood that these represent only the tip of the iceberg both of what would be possible to analyse and what would have been exchanged. Low-density and low-quality investigation of large portions of the study area, scarce representation of many artefact categories in publications, dearth of classificatory/synthetic studies, limitations in my own research are all factors hampering a fuller picture. One should also bear in mind that the archaeologically-preserved record is heavily biased towards a limited range of non-perishable materials (stone, terracotta, bone, more rarely metal), that mostly had been deposited as broken, discarded objects. A large portion of what was potentially exchanged left no archaeological trace, including e.g. timber, wooden objects, basketry, salt, textiles, livestock, agricultural produce, dairy products, cosmetics, spices and drugs, many of which are documented as traded commodities in the Old Assyrian texts (Barjamovic 2011:13-14, 114, 275, table 1). Furthermore, any form of interaction would have entailed the exchange of information (including ideas, stories, beliefs, ideologies, knowledge) which were likely perceived as important, if not more important than, the actual artefacts to which they were associated. However, archaeology is extremely ill-suited to analyse this sphere, and even the best-preserved and best-documented contexts cannot provide but brief glimpses into the EBA mindset. Thus, what is analysed in this dissertation clearly represents only a minute fraction of the volume of circulating goods and information.

Additionally, whenever detailed classificatory studies and provenance analyses are available, various case studies have very clearly shown that interaction often entailed a process of local adaptation and re-elaboration of products, technologies and behaviours. Although difficult to assess, it can be suggested that in most instances external elements were modified in order to be better integrated within existing local traditions of artisanship, or within local socio-economic/political practices, or even simply to better appeal to local aesthetic tastes. It thus entailed a process of consciously modifying an object shape or a set of behavioural gestures in order to harmonise the foreign features into a coherent local system of values. Most of the typological variability detectable in pottery, figurines, burial customs and other elements not treated in detail in this dissertation (e.g. vernacular architecture, tools and weapons, among others) seem to fall within this category.

In other cases, particularly those regarding luxury/exotic commodities, there seem to have been an active attempt to imitate artefacts that could not be easily acquired by lower echelons of the society or groups marginal to specific exchange networks, artefacts that were often reproduced in cheaper materials or with less sophisticated skills than the original. Good examples seem here represented by the occurrence of locally-manufactured “Syrian” bottles, bone pigment containers, “frying pans”, duck-shaped askoi, Cycladic figurines, and Egyptianizing stone vessels and scarabs outside their supposed core manufacturing area (section 7.2). A similar process is also visible in the emulation of behaviours that were connected with the elite sphere. A good case is represented by elite funerary practices within small sites: at Demircihöyük, eight large stone graves were equipped with copper-alloyed knobbed maces and twin cattle burials, elements that also appear at Alacahöyük where however the graves are larger and better-built, the knobbed mace is in gold and there are up to 10 cattle burials per grave (sections 4.1.3, 7.1.4). At Kalınkaya, on the other hand, some of the graves were equipped with simple copper-alloyed standards that clearly recall, but are no match for, the sophisticated standards of Alacahöyük (section 7.1.4). The monumental architecture of Kanlıgeçit KG 2, very similar to the Troy IIc citadel but three times smaller, seems another obvious example of emulation (section 7.2.2.1). Lastly, the appearance of the so-called “lead figurines” in the latest EBA hints at the introduction of a fully-fledged pantheon with precise parallels to Upper Mesopotamian traditions. It does not seem accidental that these figurines occur, in the EBA as in the following

MBA, only within medium-large sites along major routes, and were thus probably consumed by a cosmopolitan audience that emulated religious practices of distant but culturally-influential societies further east.

A last point to make is that most artefact categories treated in this dissertation reveal the almost-exclusive exchange of high-value, low bulk items (e.g. metal, semi-precious stones, luxury items) across the area. While this might be a real pattern, it is also connected with the general disinterest in studying artefact classes (e.g. transport and/or storage vessels, cf. Bevan 2014) that could provide direct clues for the circulation of low-value, high-bulk products, and the absence of textual records that could shed light on the exchange of cheaper, archaeologically-invisible commodities (e.g. agricultural produce, salt, wool, timber, stone for building). However, the existence of longboats and wheeled carts already by the late 4th-early 3rd millennia, and the introduction of sailboats and donkey in the latest EBA, would have made possible to move large quantities of products in single episodes (section 3.1). Maritime transport in particular would have been faster and cheaper than overland transport and would have been more suited for low-value/high-bulk exchange (Sherratt and Sherratt 1991:362). It is thus perhaps not accidental that the only evidence for the regional circulation of storage jars presently occurs at coastal sites such as Poliochni, Troy and Limantepe (c.2700-2600 BC onward) and at the Dokos shipwreck, c.2200 BC (section 7.2.1.3). Also, it cannot be excluded that livestock, timber, agricultural produce and other non-precious commodities might have circulated in significant quantities within local networks (up to c.40-50km range?). In this regard, a recent study at Küllüoba suggests that the stones employed in house construction would have been available from quarries 4-10km away from the settlement (Fidan 2012:3-4, fig.4). While it is generally assumed that bulk commodities in Anatolia and the eastern Mediterranean only became extensively exchanged in the later 2nd millennium BC (cf. Beaujard 2011; Sherratt and Sherratt 1991), one should entertain the possibility that some experimentation might have occurred already in the mid-late EBA, a phase in which the increase in both trade organisation and socio-political complexity may have favoured such enterprises at least on a small scale.

8.2.3 Mechanisms of interaction at increasing scales

Different strands of evidence suggest that mechanisms of interaction are very much related to the spatial scale at which the exchanges occur: interaction among the inhabitants of small hamlets such as Demircihöyük or Karataş had probably very little in common with that occurring between professional traders across large areas. Intuitively, it can be argued that the robustness of any network (thus its ability to persist in time) is largely dependent on the intensity and frequency at which its individual components, people in this case, meet and are able to reinforce their ties. In this sense, in a pre-modern world physical distance would be the single most important factor affecting frequency and intensity of interaction, with both elements decreasing at increasingly larger distances. Within small networks (1-50km radius for the EBA?), these ties can be established and maintained in time mostly through frequent face-to-face encounters. However, as networks grow in extent, the physical distance between their participants hampers frequent meetings and risks to fragment the networks in smaller clusters. Thus, some changes in their structure are needed in order to preserve the relation between the different components.

Several measures might be employed to counter the disaggregation of a network: for instance, a higher mobility of its participants may extend the range at which frequent and intense encounters can be maintained. Alternatively (or complementarily), the presence of intermediaries between the individual network's participants reduces the need for higher mobility; during the EBA, these figures might be identified in professional traders (and possibly envoys/messengers) and leaders that connected individual communities together at different socio-political levels. Also, innovations in transport technology (such as those occurring in EBA Anatolia: longboats, wheeled carts, donkeys, sailboats) may promote movement faster and/or allow heavier loads to be carried, thus effectively shrinking the perceived travel distance between hitherto distant places (fig.8.13). A similar effect on movement can also be achieved by improving road efficiency: maintained and engineered roads with bridges, road stations and inns both favour faster movement and provide the logistics for large parties to travel wider distances. Even in absence of archaeologically-recognisable structures, some forms of infrastructure must have existed already in the EBA, at least to provide the large quantities of water and food/fodder required for parties travelling longer journeys, particularly those involving pack animals or longboats (section 3.5). Overall, it can thus be suggested that increasingly large networks can only exist when matched by increasingly complex socio-economic and political structures that support the existence of formal intermediaries, sophisticated transport technologies and substantial road infrastructure.

The nature of what is exchanged seems also strongly connected to the scale at which certain things are circulated: during the EBA, the spatial analysis of a considerable number of commodities (in addition to practices and technologies) indicates that, while most of these remained in the place of origin or travelled for only few tens/hundreds kilometres, a small portion was exchanged across much larger distances (fig.8.14). Although a neat distinction cannot be performed, it can be argued that elements that circulated at smaller scales belonged to the sphere of utilitarian objects and of features imbued with values meaningful only within a certain socio-cultural milieu (e.g. specific ritual practices). Copper (in semi-finished and finished form) and obsidian experienced a wider level of circulation, while the elements that travelled farthest seem to be mostly associated with elite consumption: with the present evidence, lapis lazuli objects, Harappan-style carnelian beads (figs.7.54, 7.56) and perhaps tin travelled at distance up to c.3,500-4,500km as the crow flies from their supposed source.

A further point to stress is the role played by the main EBA first- and second-tier centres (and arguably the elite groups residing in them) in the establishment and maintenance of long-distance networks. Elements such as lapis lazuli, ivory, carnelian, cosmetics, gold/silver artwork, administrative technologies and some forms of elite behaviour are almost exclusively found within large sites (fig.8.15) that are often several hundred kilometres away from each other, but these elements are instead rarely present at intervening sites in between. This pattern suggests forms of directional exchange operating between main centres. Additionally, craftspeople producing the most sophisticated artwork of EBA Anatolia (cf. in particular metalwork employing lost-wax, filigree, inlay techniques, but also "alabaster"/gypsum figurines) seem to have been mostly hosted within the largest EBA sites such as Troy, Kültepe, Alacahöyük and Poliochni. While direct evidence is scarce, I have already suggested that there might have been some form of elite control over their manufacture, at least concerning elaborated silver/gold objects (section 6.2.3). Other forms of specialised craft such as obsidian pressure-flaking, metallurgy and wheelmade pottery manufacture also seem to be absent in smaller sites (e.g. Demircihöyük and Karataş). Even if obsidian, metal objects and wheelmade pottery do occur at most sites, when quantitative analyses are available they suggest that larger centres tend to yield higher proportions of these products. With the available evidence, it is possible to suggest that larger-scale networks mainly functioned through the most important regional centres, which acted as the main producers, distributors and consumers of the commodities. Minor sites occasionally received small proportions of luxury products that made their way into smaller-scale networks.

Given the inability of the archaeological record directly to access the mindset of EBA individuals, it is difficult to gauge here the possible rationales behind the episodes of exchange documented throughout the dissertation. This notwithstanding, the use of weight standards, confined to small quantities of high-value, low-bulk solid materials (likely metals, semi-precious stones) does suggest a concern to precisely quantify what was exchanged. Thus, it can be argued that some form of profit-driven trade was in existence at least for a portion of the exchanges occurring in specific socio-economic contexts (metal workshops, elite buildings). It does not seem accidental that, with very few exceptions, balance beams and stone weights occur at sites that also extensively participated in interregional networks. In both EBA Mesopotamia and MBA Anatolia, silver was employed as proto-currency to buy anything from a loaf of bread to a whole village and mechanisms of demand and supply were clearly in place, with prices fluctuating in time and depending on the location of the transaction and product availability

(Dercksen 1996:43-45, 155-157; Lehner 2014:141-142; Ross 1999:300). However, in EBA west-central Anatolia there is at present no evidence for this or for the existence of formal marketplaces or the accurate recording of exchanges, suggesting against the presence of dynamics typical of market economies. Furthermore, the absence of weights at smaller sites indicates that most transactions (particularly those at smaller scales) occurred outside the sphere of formalised profit exchange (chapter 4).

On the other hand, there exist a small number of goods produced both in Anatolia (e.g. Alacahöyük, Eskiyapar, Horoztepe and Troy metalwork) and elsewhere (e.g. objects in lapis lazuli, faience, Harappan carnelian, ivory) that only occur within the most important sites in the interregional networks, are rare and few in number, and represent the product of highly-skilled craftsmanship (fig.8.15). These features suggest that they were not part of the usual exchanged commodities, and may have been instead intended as "gifts" for the elites (cf. Bachhuber 2015:33; Tonussi 2007:353). While there cannot be direct evidence for this hypothesis, textual evidence in contemporary Syria and later Anatolia might corroborate it. The late EBA Ebla's archives document the frequent practice of presenting royal envoys, messengers, ministers and elders with "gifts" composed of metal artefacts and precious garments, while silver and gold bullion were often sent as "gifts" to other kings (Archi and Biga 2003; Archi 2013). Similarly, in MBA Anatolia "gifts" were offered to the local king by the Assyrian merchants (Barjamovic 2011:310). In these contexts, the word "gift" has clearly different connotations that range from "tribute", to "tax" or "bribe", to "payment" for a service (cf. Bevan 2007:25; Komter 2001). Although the EBA Anatolian socio-political context was certainly less complex, it is probable that certain forms of "gift" may have been in place among the local elites, for instance as a way to maintain alliances.

In light of the observations presented here and earlier in the chapter, the three models of interaction proposed in section 2.3.4 can now be revisited:

a) **Wave interaction** is characteristic of social networks operating at small scales (within the valley-system and interlocking valley-systems) and across all social segments of the communities involved. The bulk of all interaction episodes would have been characterised by small-scale, multidirectional movements, largely without the presence of intermediaries and via a dense network of pathways connecting one village to another, whose existence can at present only be hypothesised but not detectable in any detail. This type of interaction promoted the circulation of mundane, utilitarian objects, the raw materials employed in their manufacture and the technical skill sets necessary in their production, but also other elements pertaining to the daily life of the local communities, such as vernacular architecture and non-elite funerary practices. These systems seem very much constrained by topography, for reasons outlined above, and the analyses that tackled interaction at such scales suggest that they might be quite persistent over time.

b) **Dendritic interaction** is characteristic of supply networks at larger scales, where the main sites seem to have had a larger role both as producers of finished artefacts and centres for their distribution at the local and regional level. These hubs would have acted as economic funnels, controlling or at least directing the flow of people and goods. Dendritic networks seem to have been dependent to a larger degree on the already-mentioned highways, and while still constrained by topography they seem to have been able to cross major cultural frontiers. Their existence was in part related to the presence of specialists, both for production of the exchanged goods (craftspeople) and for their distribution (intermediaries, traders). Obsidian, Anatolian carnelian, metals (copper, but also tin, some quantities of gold and silver) and metalwork, and possibly other commodities not tackled in this dissertation (e.g. salt, high-quality flint, rock crystal, agate), are good examples of what circulated in these networks. A small portion of the exchanges within these networks may have entailed the employment of balance weights, thus in the context of profit exchange.

c) **Inter-centre interaction** is characteristic of interregional networks that seem to have been highly dependent on highways and may have essentially operated between large centres. They only involved elite groups and intermediaries between them (traders, envoys, messengers), and highly-skilled artisans manufacturing the luxury goods. Commodities such as lapis lazuli, Harappan carnelian, ivory, metal artwork were part of these exchange systems, and so were ideas and behaviours connected with elite ideology: funerary display, monumental architecture, administrative technology.

It is important to stress that, within a specific geographical region, a number of social networks active at different scales would have co-existed and would have to a larger or lesser extent been intertwined. Not only they employed the same road system (at least the highways), but also the first- and second-tier centres may have acted as places where people from different networks could convene, thus they may have represented bridges (or gateways) between groups that would otherwise rarely have met.

8.3 Expanding networks

By the early EBA and more so towards the end of the 3rd millennium, it seems clear that exchanges had become a fairly sophisticated enterprise that was not only the result of a vast number of small-scale episodes of interaction or sporadic longer journeys, but was instead supported by an increasingly organised structure at different levels, from extraction of primary resources, to production, to circulation of goods. The complexity of this multi-tiered organisation, coupled with new transport technologies, resulted in the possibility to considerably expand the range at which exchanges could be carried out. Several researchers have already proposed that the development of the interregional networks is intimately connected with the rise of stable elites and the intensification of metal production at unprecedented scales (Efe 2002, 2003, 2007; Schoop 2011a:32-33; Şahoğlu 2005; Zimmermann 2009). This hypothesis will be revisited here in light of the evidence presented in this dissertation, first by assessing the level of EBA social complexity, then by suggesting the importance of metal in EBA societies, and finally by attempting to correlate these observations with the evidence for the expansion of the interregional networks.

8.3.1 Social complexity in prehistoric Anatolia

In a widely influential work, Gordon Childe drew a list of ten traits that would in his mind define a fully-fledged state entity (1950). Modifying and expanding his original concepts, these can be summarised as follows:

1) Large settlements, and high population densities;

2) Presence of large structures result of collective efforts (e.g. public buildings, temples, fortifications), and intra-settlement division between public and private sectors;

3) Social differentiation (e.g. visible in architecture and burials), and presence of stable elites;

4) Craft specialisation;

5) Control over storage (agricultural produce, livestock, “liquid” wealth), and complex administrative apparatus (record-keeping, e.g. through sealing, writing, bureaucracy);

6) Complex ideological apparatus (organised religion, public celebrations, power display);

7) Presence of a developed regional settlement hierarchy, in which first- and second-tier centres drew resources from satellite settlements;

8) Organised territorial control (over resources and routes) and warfare;

9) Expression of sophisticated thought (art and science, including mathematics, see e.g. metrology);

10) Highly developed regional and interregional exchange networks, in terms of spatial scale and complexity in the organisation of production and distribution.

Childe was aware that these traits were not necessarily unique to urban societies, and may have been present in simpler social entities as well, albeit on a smaller scale and not co-occurring at the same time. But his main goal was to assess whether a settlement could be considered a city, and whether a society could be called “civilised” (or perhaps a “state society” in modern terms); for a positive answer, all of his traits had to be present. Despite much debate (cf. Smith M 2009 for a recent summary) regarding the validity of his positions, I would like to argue that these markers are still a useful framework to assess the degree of organisational complexity in societies like those of pre-literate Anatolia, if the research questions are asked differently. Rather than trying to provide a binary yes/no answer to the matter “can EBA Anatolian communities be considered urban societies?”, these traits can be more successfully employed to sketch the long process that led to the foundation of state entities, assessing the presence and co-existence (and possibly, the intensity and complexity) of individual markers of complexity in different periods of Anatolian prehistory.

I would concur with recent emphasis on the fact that the path towards more complex forms of social organisation should not be assumed to be a unilinear process, but one punctuated with episodes of early experimentation and failure, and then more stable spread of “complex life”, itself disrupted at times by a return to simpler socio-economic strategies (cf. Horejs 2014:16). Furthermore, even within the same chronological horizon, communities living in different regions and different eco-systems likely experienced different degrees of complexity (cf. Çevik 2007 for the EBA). More importantly, as very clear from the EBA dataset, even within the same ecological niche (e.g. the same valley) contemporary settlements did experience different levels of internal social organisation, based on their size, their socio-economic strategies, their ability/desire to maintain specialised craftsmanship, and their location within the exchange networks. Thus, an attempt to map different degrees of social complexity at any one time would likely illustrate a highly fragmented landscape, with peaks and troughs of complexity occurring within relatively short distances (cf. Perello 2011:56). From an analytical perspective, these considerations become essential when one is confronted with the evidence that potentially allows assessing diachronic patterns towards higher levels of social inequality. For all periods treated here (i.e. Neolithic to the end of the EBA), there is a very limited number of sites across western/central Anatolia (between 5-10 and 30-40), often separated by large distances, often small or marginal to the main networks, possibly at the lower echelons of regional settlement hierarchies. Also, because of the high continuity of occupation experienced by many large sites (section 3.2.2), most of the main Neolithic and Chalcolithic centres may lie undetected or scantily investigated under the major Bronze Age settlements. Furthermore, as better appreciated by the detailed assessment on EBA sites (fig.1.22), the spatial extent of excavated archaeological layers at any one site represents a minute fraction of the total occupied area of a settlement,[58] thus severely constraining attempts to provide conclusive remarks for each context.

Even with these limitations, it seems clear that several of Childe's markers of complexity can be detected in Anatolia already during the 8000-4000 BC period (fig.8.16). For instance, large settlements like Çatalhöyük (13ha) and Can Hasan (10ha), with a population estimated between c.5,000-8,000 individuals, already existed in the Neolithic (fig.8.17, Düring 2007:158). Special-function, collective buildings have also been recognised at Çatalhöyük, based on their much larger size, internal space organisation and presence of large numbers of sub-floor burials (fig.8.18, Düring 2007:163-168), and at Aşıklı Höyük, where two "monumental complexes" were defined based on their size, thickness of their walls, materials employed (stone) and elaborated painted floors and hearths (Düring 2011a:62). Thick enclosure walls (arguably, evidence of collective efforts) have further been excavated at Late Neolithic Hacılar, Bademağacı and Kuruçay and Middle Chalcolithic Hoca Çeşme, Gülpınar, and Güvercinkayası (figs.8.19-8.20, Düring 2011b).

Düring has recently criticised the interpretation of these structures as actual fortifications, proposing them as symbolic boundaries between the living and natural spaces, as protection against flood and/or as measure to keep livestock inside the settlement (2011b:70-73). By his own admission, however, some of these are massive (ranging between two and four metres in thickness) and have buttresses and "towers" which are difficult to justify as non-defensive elements. Moreover, the position of Güvercinkayası on a rocky hill-top of difficult access strongly points to a defensive strategy. Additionally, at LN Höyücek, Hacılar and Bademağacı there are destruction layers covering the whole excavated area, with *in situ* findings and unretrieved victims and in some cases with large amounts of sling projectiles scattered in the burnt layer, elements that –together- suggest episodes of organised warfare (Clare et al.2008). Lastly, long-distance networks certainly existed already in the Neolithic and more so in the Chalcolithic periods, and were supported by a substantial degree of craft specialisation for at least few products entering the interregional exchanges (see below).

We are at present unable to understand in detail the LCh period (c.4000-3200 BC), since well-published and extensively excavated levels pertaining to this period are mostly known from small sites, while the large LCh centres are mostly buried under subsequent Bronze Ages layers (fig.8.21, Schoop 2011b:165). Recent syntheses on the LCh have however advocated for pushing back the appearance of early forms of social stratification into the 4th millennium (Horejs 2014; Schoop 2011a). From what can be glimpsed with the patchy evidence at hand,

[58]One should add that geophysics' surveys, potentially an extremely powerful tool to gain a more comprehensive understanding of settlement size and layout, are only sparingly employed in pre-Classical Anatolian archaeology.

some patterns emerge that will become more prominent in the EBA: for instance, the deposition of weapons in male graves is a new phenomenon, and is best documented at the sites of Ilıpınar and İkiztepe, dated to 3700-3550 and 3350-3000 cal BC respectively (fig.8.22, Roodenberg 2008:320; Welton 2010:103). For İkiztepe, there is also evidence for weapon injuries on an exceptional number of individuals (c.27% of all adults, 42% of males, Erdal and Erdal 2012). At least two fortified settlements are also known in west-central Anatolia: Çukuriçi Höyük, with a 4m-wide, 2m-deep ditch dated to c.3300-2900 cal BC (fig.8.23, Horejs 2014:19-22) and Çadır Höyük, surrounded by a 1.5m-wide gated enclosure wall dated to c.3600-3100 cal BC (Steadman et al.2008:58-59). This combined evidence suggests a surge of organised violence from previous phases. At İkiztepe, there is further a noticeable concentration of metal wealth and weapons in a limited number of burials, particularly of male adults (Bilgi 2005; Doğan 2006), at present the earliest elite graves in west-central Anatolia. Lastly, the intensive survey around Beycesultan[59] has revealed a regional settlement hierarchy already in the 4th millennium, with a few sites around 9-10ha, others around 3-5ha, and a large number of smaller ones (Abay 2011:22).

In the earliest 3rd millennium, there are several fortifications enclosing small areas (0.3-0.8ha), including Limantepe VI, Demircihöyük E (fig.4.3), Bakla Tepe, Troy Ia-c, and noticeably at least one much larger fortified site, Hacılar Büyük Höyük (4ha), whose destruction layer is dated c.3000-2900 cal BC (fig.8.24, Umurtak and Duru 2014). In this phase, we also have the first clear evidence for elite buildings: Troy Ia-c megaron 102, Poliochni Blue megara 317, 832 and 605, Karataş I Central Complex (fig.4.17), all found in relatively small settlements. The earliest balance weights are found in this phase (at Çukuriçi Höyük IV-III and Poliochni Blue) and so are the earliest container sealings with Anatolian motifs (at Alişar Höyük 17-13M) (sections 5.1.2, 5.2.2.3). Even in the general dearth of early EBA funerary contexts, some of the Alacahöyük “Royal graves” belong to the c.2900-2650 cal BC period (fig.1.11): their sophisticated grave goods point undoubtedly to the existence of elite groups and further reveal the high level of craft specialisation attained in metalworking. Later funerary contexts (c.2700-2400 BC) indicate that social stratification becomes apparent also at relatively small sites like Demircihöyük and Karataş, witnessed by the concentration of (metal) wealth in a limited number of graves, by the differential funerary treatment of elite members, and by the variety of attributes associated with different age/gender groups (sections 4.1.3, 4.2.5, 7.1.4). The first evidence for a division between public and residential areas comes from Küllüoba IVD (c.2600-2500 cal BC, fig.1.17) and Troy IIa-c (c.2500-2400 cal BC, fig.7.39), where monumental public

[59] This survey is one of the very few projects in Anatolia that attempted to quantify the extent of the site in each phase, and investigated the area beyond the mounds themselves.

buildings are separated from the remaining settlement by substantial walls. This period also records the earliest public ceremonies, that seem in most cases mediated by the elites: for instance, the large hearths and platforms associated with food remains outside Karataş V:1 Central Complex (fig.4.17c), or the "votive" pits found within the Troy IIg, Limantepe, Küllüoba III and Kanlıgeçit KG2 citadels (Kouka 2011; Özdoğan and Parzinger 2012:35-37; Türkteki 2010:133).

Although excavation projects have so far rarely investigated the areas beyond the mound, it seems nonetheless clear that around the mid-3rd millennium some very large sites begin to appear, whose size far exceeds what is known for previous periods: Troy (c.10ha), Alişar Höyük (at least 18ha between mound and lower terrace), Limantepe (at least 15-20ha encircled by the external fortifications, fig.1.15), Beycesultan (estimated at c.20ha, Abay 2011:26), and Acemhöyük (level XI fortification seems to encircle most of the mound, i.e. some 40ha, Öztan and Arbuckle 2013:280). Several well-published surveys show a clear settlement hierarchy in the c.2800-2400 BC period (figs 1.18, 4.1, 4.12), and at least in the area around Beycesultan there is evidence for the earliest attempts at territorial control in the form of small fortified sites at the entrance of the valleys and in correspondence of river crossings (fig.1.18). Furthermore, across the EBA and more so during its last phases, organised violence becomes a frequent recurrence. This is clearly detectable from widespread destruction levels in settlements characterised by extensive burnt areas, large amounts of in situ finds (often precious items), unretrieved victims, (re)construction of fortification walls after the destruction, and site abandonment (fig.8.10, Massa 2014a). Additionally, markers of violent death are present on a significant proportion of adults in all funerary contexts with osteological analysis (Massa and Şahoğlu in prep.). While only speculative, these conflicts may have been triggered by the desire to acquire resources: fertile land, raw materials' sources, but possibly also control of major routes, particularly at key network hubs and landscape funnels. To date, there is no conclusive evidence for the existence of a fully-fledged pantheon and templar buildings[60] in Anatolia before the earliest 2nd millennium (section 7.2.3.3), elements that were probably introduced from Upper Mesopotamia in the Old Assyrian period (c.1950-1800 BC) together with writing and complex archive upkeep.

To what extent late EBA centres directly controlled their surrounding landscape is an issue that is difficult to resolve, since it would require targeted intensive surveys around them that are however absent. While some have argued that recognisable "pottery groups" (with areas between c.5,000-30,000km^2) are coterminous with the extent of "principalities" or "kingdoms"

[60] Kültepe level 12's large building has long been considered a "temple" (Ezer 2014:7), however this hypothesis has so far not been substantiated by detailed analysis.

(e.g. Efe 2002, 2003; Sarı 2011:151-152; 2013), this seems improbable to me (cf. section 7.1.3), since direct control of such large areas would have likely entailed a more complex administrative apparatus than it is visible from the available data. A comparison with better-documented and better-studied early state societies in Upper Mesopotamia helps in contextualising the problem. At the close of the 24th century BC, northern Syria was politically dominated by four large centres (Armanum, Ebla, Nagar and Mari) that, at the apogees of their power, were controlling territories between 10,000-30,000km^2 in size through direct administration or vassalage ties with a number of satellite city-states (fig.8.25, Archi 2011, 2013). Two of them are extensively investigated, and show sizes well beyond contemporary Anatolian counterparts: Ebla/Tell Mardikh was at least 56ha (but probably more, since the lower town has not been investigated), while Nagar/Tell Brak was around 130ha in total (Ur 2012:31). A vast bureaucratic apparatus was governing the economy, religion and politics of these states; scribes accurately documented the accumulation and redistribution of capital (including metals, wool, textiles and agricultural produce), and diplomatic agreements. Ebla's archives in particular record up to 11,000 people under direct control of the Palace, including several hundred specialised craftspeople (Finer 1997:172-173). Furthermore, accounts of military campaigns document not only the frequency of these episodes, but also the scale of mobilised armies, often comprising thousands of soldiers (Archi 2013; Archi and Biga 2003). At present, there is no evidence for this in late EBA Anatolia, and the situation depicted here can only be approximated by that of MBA central Anatolia, when the area truly got integrated *au pair* within the Near Eastern political arena.

8.3.2 The importance of metal for the EBA economies

It can be argued that, given its value and its potential to be recycled innumerable times, metal was rarely deposited in archaeological contexts unless accidentally lost, abandoned in destroyed settlement contexts or buried in hoards/graves (so-called "metal traps", Nakou 1997). What archaeologists retrieve from excavation is normally only a minute fraction of the volume circulating at any one time (cf. Bevan 2007:26-27). The scarcity of provenance analysis on metals outside Anatolia and the difficulty to pinpoint a precise source (section 6.2.4) further hampers our understanding of the extent and mechanisms of regional and interregional networks based on metals. The role of metal for EBA economies needs thus to be addressed by looking at the scale, intensity and organisational complexity of metal production in addition to the (presently) coarse picture provided by provenance analysis.

Metal craft is not a phenomenon restricted to the EBA, and Anatolia is indeed one of the regions in the Old World with the longest metallurgical history: the earliest malachite and native copper beads date back to the PPN (at Aşıklı Höyük and Çayönü, c.8000-7500 BC), while the first experimentation with cold-working (hammering) is found in ECh Can Hasan (c.6000 BC, Yalçın 2008b). There is further evidence for both mining, smelting and casting of copper oxide ores already at MCh Yumuktepe and Değirmentepe (c.5000-4800 BC, Yalçın 2000a, 2008b) and Kozlu mine (4700-4500 cal BC, Wagner and Öztunalı 2000:49).

However, with the available data there seems to be a change of pace regarding extraction, production and circulation of metal around the early-mid 4th millennium (fig.8.27), probably associated with the improvement of extractive technologies and pyro-technology, that allowed better control over casting and the exploitation of more widely-available copper sulphide ores, galena (for silver) and primary gold deposits. The first exploitation of several mines dates to this period, including Kestel (3700-3300 cal BC, Yener 2000:table 3), Gümüşhacıköy (Sayre et al.2001:82), and Murgul (3600-3450 cal BC, Wagner and Öztunalı 2000:47). The earliest evidence for smelted silver at Fatmalı-Kalecik and related Euphrates sites is also similarly dated (Hess et al.1998). The earliest metal workshops in west-central Anatolia (at Limantepe, Bakla Tepe, Çukuriçi Höyük and Çamlıbel Tarlası) are all dated between c.3600-3100 cal BC (section 6.2.3). In parallel, from the mid-4th millennium onwards there is also a noticeable increase in the amount and typological range of metal objects (mostly copper but also silver) deposited in archaeological contexts (Efe and Fidan 2006:19-20). The earliest arrival of central Anatolian copper (from Bolkardağ and Çorum) in Upper Mesopotamia is likewise dated to the Late Uruk, c.3300-3000 BC (Begemann and Schmitt-Strecker 2009:21-26; Hauptmann et al.2002:60).

By the early 3rd millennium there is a further increase in the number of metallurgical workshops, e.g. at Thermi, Poliochni, Emporio and Troy in addition to the already-existing ones at Limantepe and Bakla Tepe. Both finished objects and metallurgical tools reveal high levels of artisanship, with the employment of filigree, multi-valve casting, lost-wax and inlay techniques (section 6.2.3). The large EBA mining complexes of Derekutuğun and Kestel, among others, have their most intense period of exploitation between c.2900-2100 BC, and witness a scale of extraction and production not documented before (section 6.2.2). In the same phase, ingots (and moulds for their production) make their appearance in west-central Anatolia, and mark a turning point in how metal was circulated (section 6.2.3). Their shape seems to have been conceived for easy transportation (thus a production explicitly geared for exchange), and points to an interest in the raw metal itself (for further local re-working) in addition to finished products. Moreover, the introduction of standardised weight systems (from the Levant and Mesopotamia), often clearly associated with metalworking (section 5.1.3), suggests a direct interest of Levantine/Mesopotamian agents for Anatolian metal, and indicates that at least a portion of the transactions involving metals occurred in the context of profit-driven trade.

After c.2500 BC, the interregional networks based on Anatolian metals seem to have considerably expanded, reaching as far as Lower Mesopotamia and Egypt. Even in the general scarcity of provenance analysis on silver/gold artefacts, lead isotopic signatures of several silver objects from Assur, Ur, Khafaja, Tello and Tell Raqa'i (dated c.2500-2000 BC) have good matches with the Taurus deposits (Yener et al.1991:561-566), while similarly-dated gold objects from Ur and Egypt seem to have originated from the Sardis placer in western Anatolia (Young 1972).

Despite its scarce archaeological visibility, the importance of metals for the EBA economies can further be addressed with several observations: first, its malleability and ability to melt allowed people to create shapes that were not possible before and that were not constrained by the form of the raw material (e.g. bone, stone), thus considerably increasing the range of products that could be manufactured and exchanged. Furthermore, by the late EBA alloyed and unalloyed copper supplanted stone and bone as primary medium for production of weapons, personal ornaments and some classes of tools, and was present, in varying quantities, across all excavated sites. The ubiquity of copper and its use in primary, mundane activities suggest that it would have been one of the most important commodities exchanged in the supply networks, both at the regional and supra-regional scales. On the other hand, silver and gold were the medium of choice for luxury items, and composed the lion's share of all archaeologically-recognisable elite paraphernalia both in graves (e.g. Alacahöyük and Horoztepe) and settlement hoards (e.g. Troy, Eskiyapar and Poliochni). In Anatolia (and arguably elsewhere in the Near East), precious metals thus seem to have had a special role in constructing elite identities and maintaining power ideologies. Also, the high value of metal and its low volume made it the perfect medium to effectively accumulate large amounts of capital in ways not possible before: e.g. while one tonne of silver (at density 10.49gr/cm^3) comfortably fits into a 50x50x50cm cube (fig.8.28), the same amount of silver could buy approximately 45,000 sheep at MBA Kaneš/Kültepe (cf. Barjamovic 2011:table 1).

In addition to these elements, metal had an essential role to play in the more complex Levantine and Mesopotamian economies further east, where by the mid-3rd millennium silver was employed as standard equivalency and effectively had the role of proto-currency (Ross 1999:300): a steady influx of silver would have been paramount to keep the system in place. Ebla's archives (c.2380-2330 BC) further provide an exceptional glimpse into the sheer volume of silver and gold circulating in the region. Two texts document the payment of a tribute to Mari consisting of 1,028kg of silver and 63kg of gold, in two separate occasions over a few years (Archi and Biga 2003:2). When political conditions shifted, a king of Mari paid instead a tribute of 4,620kg of silver and 336kg of gold to Ebla (Pettinato 1976:47). A minimum estimate[61] suggests that the Ebla Palace handled up to 3,000kg of gold and 30,000kg of silver across 40 years (Ross 1999:244-245). One document also lists 500 smiths working under direct control of the Palace (Archi 1988:27), showing the importance of metallurgy at the site. Although Ebla was a large Mesopotamian centre, it was by no means the only one, nor the most important: similar quantities of precious metals were certainly handled by many other city-states. Notwithstanding the dearth of metal provenance analyses for Levantine and Upper Mesopotamian artefacts, metal circulating in this region was at least partially coming from the Amanus, Taurus and Antitaurus Mountains, substantially closer than Caucasian or Iranian sources (fig.8.25, Archi 1993; Tonussi 2007:341-342). It can be argued that at least a portion of the frequent military campaigns and diplomatic alliances documented in the Ebla's archives may have been carried out to control major "metal routes" from eastern and central Anatolia, as it also has been proposed for the Akkadian expansion in the direction of the "Silver Mountain" (Bolkardağ?) and the "Cedar Forest" (Amanus?) (fig.8.26, Marfoe 1987; Ross 1999:359; Tonussi 2007:97).

8.3.3 The development of interregional networks in prehistoric Anatolia

While regional and interregional networks seem to have considerably expanded during the late 4th-early 3rd millennia, there is substantial evidence that large-scale networks already existed in Anatolia at earlier times. This is for instance proven by the circulation of marine shell beads and bracelets at sites c.200-250km inland during the Epipalaeolithic and Neolithic (c.10000-6000 BC, Baysal 2013a, 2013b; Baysal and Erdoğu 2014), or the exchange of marble products (figurines, bracelets and vessels) in the Neolithic and Middle Chalcolithic (c.7000-4000 BC, Takaoğlu 2005; Ünlüsoy 2002). In particular, even in the general dearth of marble provenance analysis, a study on three marble beaker fragments from Kumtepe IA (c.5000-4500 BC) indicates their probable origin from the deposits near Aphrodisias, c.550km away from the site (Zöldföldi 2011:199). At present, the largest and best-documented networks are those of Epipalaeolithic, Neolithic and Chalcolithic obsidian. Small quantities of Melian obsidian reached as far as the Marmara Sea and Macedonia, c.700-900km away from the sources following the proposed maritime routes (fig.8.3, Milić 2014). Central Anatolian (EGD/ND) obsidian was instead exchanged over a vast area extending from north-western Anatolia to

[61] This estimate is based only on retrieved texts, themselves incomplete and only partially published; these documents are further only related to the Palace, thus excluding transactions carried out by private merchants.

southern Levant and the Upper Euphrates valley, c.800-1,000km away from the sources in each direction (fig.8.29, Carter et al.2013; Frahm 2010). Quite strikingly, the Aegean Neolithic/Chalcolithic obsidian network closely recalls that of the 3rd millennium, both in terms of proportions of materials reaching each area and the overall spatial extent, in fact perhaps reaching even farther afield (cf. fig.6.3 with 8.3). The extent of the EGD/NND obsidian network further indicates that contacts between central Anatolia and Levant/north-western Syria were established already by 10000 BC. Thus, both cases strongly suggest that EBA networks built upon an already-existing and well-established set of routes. Although there are at present no works that have attempted reconstructing in detail the possible routes involved in these early exchanges, many of the main EBA Anatolian hubs have also Neolithic and/or Chalcolithic occupation (fig.3.25),[62] suggesting that the routes sketched in chapter 3 may have, to some extent, already existed in earlier periods.

What emerges from recent studies is that even these early networks were supported by a fairly complex organisation behind the production of the exchanged products (cf. Steadman 2000:178-181). For instance, intra-site manufacture of marble bracelets at Orman Fidanlığı, Kanlıtaş and Aktopraklık (5th-4th millennia), limited to certain areas of the settlement and several tens/hundred kilometres away from the supposed sources, suggests some degree of work specialisation (Baysal and Erdoğu 2014:374). This is even more evident at Kulaksızlar (c.4800-4200 BC), an open-air marble workshop that was employed in the manufacture of sophisticated products such as Kilia figurines and pointed beakers (fig.8.30, Takaoğlu 2005). Here, the spatial patterning of the debris highlights that different object types in different stages of production were worked in different areas (possibly by different individuals?), thus suggesting a quite complex *chaîne opératoire*. The considerable skills needed to produce these artefacts, in particular the Kilia figurines, as well as the low variability in size, shapes, details of the artefacts and in the technology employed further hints at the involvement of expert craftsmen in the process. The *chaîne opératoire* behind obsidian production was likewise articulated in different, spatially-separated stages, sometimes with the employment of sophisticated techniques that were not known to the end-users (Pèrles 1992, 2007; Frahm 2010:580-582). Interestingly, Pèrles notes that, already in the Neolithic, obsidian artefacts were often clearly manufactured for exchange, since their shapes were not determined by the desire to maximise the exploitation of the raw material, but rather to allow end users to re-work the pre-forms for the creation of smaller tools (2007:59).

[62] Milet, Limantepe, Ayasuluk/Efes, Beycesultan, Laodikeia, Alacahöyük, Konya-Karahöyük, Acemhöyük, Alişar Höyük, Gözlükule and Yumuktepe, among others.

To what extent EBA interregional networks differed from their earlier counterparts is an issue of difficult resolution, since in all cases it hard to quantify the scale and intensity of production and distribution behind the exchanges. Furthermore, while obsidian is relatively easy to provenance and extensive datasets are available, other categories (including metals) still escape refined understanding. Additionally, obsidian is very visible in the archaeological record (at least in its discarded state) while metal is not, so direct comparison of raw quantities at each site is not possible. This notwithstanding, it is clear that late EBA networks reached a spatial scale far beyond that of their pre-EBA counterparts. For instance, although the amount of goods involved in the interregional exchanges is always a minute proportion of the total material assemblages at each site (with the possible exclusion of metals), the 3rd millennium is the period that sees the earliest arrival of Levantine/Mesopotamian products in the Aegean and western Anatolia. Furthermore, in the late EBA small amounts of Anatolian goods reached as far as Lower Mesopotamia and Egypt, while a handful of artefacts reached west-central Anatolia from the Indus Valley and Afghanistan (section 7.2.3). The typological range of exchanged goods at such large scales further substantially expanded during the EBA in comparison to earlier periods (fig.8.31).

8.3.4 Metals made the EBA world go round

From the data presented above, one cannot doubt that long-distance exchange networks, metalworking and some markers of social complexity were already present in Anatolia well before the EBA, a period that therefore cannot be considered the formative phase of any of these phenomena. However, there exist a definite synchronism in how they rapidly grew in extent, intensity and scale between the mid-4th and early 3rd millennia. To what extent were these phenomena inter-related in the LCh/EBA?

To start, major centres (arguably the seat of the ruling elites) were the key hubs in the interregional networks, and that at least in some cases may have exercised some form of control over the trunk routes (at fords, mountain passes, valley entrances). These hubs seem to have also been heavily involved in the last stages of refinement and distribution of metal, as seen by the common occurrence of specialised metal workshops at these sites, often associated with ingots and ingot moulds, balance weights and scales. And furthermore, certain categories of luxury goods that circulated within long-distance exchanges (including, but not limited to, metal artwork) seem to have been mainly found in elite contexts, suggesting control over access to specific commodities. Lastly, a more intense participation to interregional exchange networks seems to have brought about a series of important changes in how Anatolian societies were structured, at least since the early 3rd millennium. Mesopotamian/Levantine influence is clearly detectable in the introduction of administrative technologies, standardised systems of weights and potter's wheel technology. Though its material applications in EBA Anatolia seem remarkably local, there are also broad similarities between Anatolia and the Near East in the way power ideology was expressed (e.g. through monumental architecture, fortifications, warfare, lavish burials, sophisticated paraphernalia, public celebrations). In the earliest 2nd millennium (and possibly in the latest EBA?) further important innovations were adopted from Mesopotamia, including writing and complex archival upkeep (supporting a complex bureaucratic apparatus) and organised religion (pantheon, templar buildings). Most of these elements are clearly associated with the elite sphere and there is at present no indication that Near Eastern social behaviours had any reverberation on the lower echelons of Anatolian societies,[63] thus again suggesting a strong link between elites and long-distance exchanges. From this evidence, it seems feasible to claim that the rise of stable elites, the intensification of metalworking and the expansion of interregional networks in the LCh-EBA period are tightly interconnected phenomena.

Christoph Bachhuber has recently proposed that elites' investment in and maintenance of long-distance networks were essentially driven by a desire to keep ties with other peers and to legitimate their status through the consumption of exotic commodities and behaviours (what he calls a "network strategy"). He further stressed that their real source of power derived instead from control over and redistribution of agricultural wealth (2015:105, 137-138, 158-159). This certainly cannot be dismissed (cf. Sherratt and Sherratt 1998:333). For instance, all the largest known EBA sites existed in areas with large agricultural hinterlands (fig.1.20). Additionally, most surveys record a rapid increase in the number of sedentary settlements (höyüks) during the EBA, also in areas that previously only witnessed ephemeral occupation (section 1.5). Among other factors, this pattern is probably the result of the more intensified use of the plough (combined with deforestation practices), and the rising importance of dairy products and textiles, that promoted a wider diversification of economic strategies (section 1.5). These innovations in the exploitation of secondary products and agricultural practices seem to have provided the necessary economic background for the sustainable growth of larger settlements, and thus of the elite groups residing within them.

Yet, one cannot ignore that metals were a fundamental and integral component of Anatolian and Levantine/Mesopotamian EBA economies, both for the production of utilitarian and prestige items, and as a way to accumulate and convert wealth in proportions that would have not been possible with agricultural produce or livestock. Despite its scarce archaeological visibility, EBA

[63] However, there might be an analytical bias, since elite contexts tend to be more visible in publications, and more intensely studied.

Syrian and MBA Anatolian written sources document the circulation of large volumes of metal. While a portion of this metal was certainly funnelled for elite consumption, the ubiquity of copper implements and the abundance of small silver and gold artefacts also in the cemeteries of small communities such as Demircihöyük and Karataş (chapter 4) indicates that metal was a pervasive presence at all levels of society. It can thus be suggested that, by the mid-3rd millennium, control over metal production and its circulation may have been an important source of income, complementing forms of staple finance.

Lastly, one should remember that central Anatolia, and even more so western Anatolia and the Aegean, had been essentially isolated from the social, cultural and political dynamics of the Near East up until c.3300-2900 BC. In light of the available data, the most plausible game-changer, and the single most important factor that justifies the substantial intensification of contacts between the two sides of the Taurus Mountains, is metal. While it is not behind the foundation of stratified societies or the establishment of exchange networks in Anatolia, metal is however what pushed the region, so far at the very margins of the Near Eastern sphere, into a radically new phase of its history. It allowed Anatolian communities to enter into an interconnected world without local precedent, but this open door also gave access to ever more sophisticated tools for forging and enforcing social inequality.

To paraphrase a famous book title, it really seems that metals made the EBA world go round.

Chapter 9: Conclusions

This doctoral research represents a first attempt to coherently analyse interaction in western and central EBA Anatolia and set this as yet little investigated region within the wider context of the Aegean and Mesopotamian worlds. It has done so by mapping flows of interaction witnessed by a large range of archaeological evidence for the circulation of raw materials, finished products, technological know-how and broader cultural practices, and by reconstructing whenever possible the routes involved in these transfers. It has also provided a suite of insights into exchange mechanisms and exchange networks operating both at different spatial scales and across time.

It seems to me that, despite the numerous limitations posed by the available datasets, the lack of many previous conceptual models and my own research shortcomings, this dissertation nonetheless is able to provide preliminary answers to each of its initial research questions, and to build a more refined picture of the EBA phenomenon in this region. An important methodological result of this project has also been to show that combining large amounts of heterogeneous, less-than-ideal datasets and different types of evidence is possible, if they are managed via a digital spatial database and are analysed with a deliberate blend of quantitative and semi-quantitative techniques.

The background work necessary to create a reliable and refined chronological framework has further allowed for an in-depth understanding of synchronic and diachronic phenomena in the study area, and permitted me to connect Anatolian events with those of surrounding areas. While still preliminary, these efforts have proven successful in tracing diachronic patterns of interaction and the spread of several technologies, and in assessing the synchronicity of related phenomena. With regard to natural and human landscapes, the analysis in chapter 3 has shown their importance in shaping human interaction, and has reemphasised the benefits of integrating datasets originating from excavated sites into a broader picture. It has suggested that the history of each community and its role within wider exchange networks are to some extent dependent on its environmental setting, and especially its location with respect to major routes, the availability of nearby natural resources and its relationship with neighbouring groups. The assessment of existing transport technologies and their availability to different social groups has additionally provided important insights regarding the organisation of the exchanges.

The substantial effort invested for this research in reconstructing, whenever possible, the socio-economic context in which individual finds were recovered offers what I would argue to be significant results that refine our understanding of patterns of production, circulation and consumption. While in many cases a given archaeological find context could not be ascertained beyond the site level (e.g. the distinction between large/small settlement, cemetery, hoard, elite/domestic area), the detailed intra-site analysis of Demircihöyük and Karataş has proved that, if enough detailed excavation data are available, this is a useful exercise to disentangle patterns of social interaction at very small scales. More importantly, this dissertation has shown that any exchange network is deeply embedded within the wider socio-economic and cultural dynamics of the communities that produced it.

Furthermore, the research experience and results outlined in previous chapters brings into the spotlight the variety of analytical limitations that hamper a fuller reconstruction of interaction patterns in EBA west and central Anatolia, some of which are general to archaeology as a discipline, and some of which are more specific to the current state of research in Turkey. Regarding the latter, among the most prominent issues is certainly the lack of clear, structured and widely-shared theoretical and methodological frameworks that may act as guidelines to formulate specific research questions and to establish overarching programmes of analysis. While there exist recent synthetic works on the "EBA phenomenon", any attempt at producing general models is hampered by the scarcity of detailed multi-disciplinary studies at the micro- and meso-levels. For instance, there are very few artefact studies beyond those focused on pottery classification (itself limited to western Anatolia), and even fewer programmes of provenance and technological analyses outside single-site assemblages. Similarly, there are limited instances of detailed intra-site analyses that aim at studying the archaeological remains in their context and within a coherent and detailed framework. Likewise, with only a few exceptions, the participation of archaeozoologists, palaeobotanists, physical anthropologists, geoarchaeologists, palaeoclimatologists, geophysics' surveyors, and IT specialists (to name a few) is still rare in Anatolian survey and excavation projects. Indeed, it can be argued that, until recently, EBA archaeology in the area has been to a large extent an "archaeology of the object", where artefacts were studied individually and in a manner largely detached from their surrounding environment (the structures in which they were found, the material assemblages associated with them), as well as from their social, cultural, technological and economic contexts.

The analysis proposed in previous chapters has further highlighted the extreme patchiness in density and quality of archaeological research in different areas. For instance, the highlands and uplands are in all cases very scantily explored, with the result that we have yet no idea of the character of mobile communities, their relationships with lowland societies or their role in exchange networks. Also, at present we have a scarce understanding about how extraction, production, distribution and control of important natural highland resources (e.g. metals) were carried out and articulated at the spatial level. The southern and northern Anatolian coasts are also scarcely known for the whole pre-Classical period. While they are more difficult to investigate (because they normally yield non-mounded sites, often buried under alluvial deposits, substantial Classical/Roman/Byzantine levels and/or destroyed by modern activities), they are key areas to understand dynamics of interregional exchanges with the Aegean, the Circumpontic region and the Levant. One of the most critical lacunae seems however to be the extremely patchy investigation of the central plateau, in particular the Konya-Karaman plains, an area that was in all likelihood one of the cultural cores of EBA Anatolia and an important interface with the Near Eastern world.

Hence, as with other research efforts before mine, this one has been deeply affected by these constraints, and the above suggestions propose areas where great strides could be made in future. In fact, a large portion of my dissertation has been spent just trying to make sense of rich but scattered and dramatically understudied datasets. Likewise, since the pace of research data collection is now accelerating quickly, I am aware that some hypotheses presented here may become outdated in just a few years. That being said, the preceding pages provide a data-rich, methodologically-sound big picture view that hopefully will stimulate enhanced debate about this formative phase of Anatolian history.

Appendix 1: Land routes data

EBA centres: the dataset comprises all known sites across the study area with an estimated size over 7ha (c.120 records), generally displaying high settlement continuity (70% from EBA to Roman period), and whose data come both from excavation (55%) and survey (45%) projects. Their location has been checked on Google Earth (5-10m horizontal error on average), and their dating is taken from their respective publications.

Hittite landscape monuments: the dataset includes 23 rock-cut reliefs from the Hittite Empire and Neo-Hittite periods (c.1300-900 BC), analyzed in detail by Glatz (2007) and Ullmann (2010). Their location has been measured by Ullmann with hand-held GPS, providing c.20-30m of horizontal accuracy.

Roman road network: it has been digitised from the 1:500.000 Atlas of the Greek and Roman World with a horizontal accuracy of c.1km when georeferenced. The probability of existence, actual path and importance of each road have been assessed by the original authors through textual evidence and archaeological remains (Talbert 2000), although the sources are not explicitly mentioned for each tract.

Roman milestones: the dataset consists of c.1000 records and has been drawn from the Roman Roads and Milestones of Asia Minor publication by David French (1988). The original location of the stones (dated 1st cent. BC-5th cent AD) has been recorded only to the nearest village, thus implying in most cases an accuracy of c.2-3km.

Ancient bridges: the dataset has been compiled from a number of publications including the Atlas of the Greek and Roman World (Talbert 2000), Roads of Ancient Anatolia (Harada and Çimok 2008), and the Digital Atlas of the Roman and Medieval Civilization (http://darmc.harvard.edu/icb/icb.do?keyword=k40248&pageid=icb.page188868). It includes evidence from the Roman to the Ottoman period (1st cent BC-19th century AD), normally with c.1km of horizontal accuracy.

Mountain passes: the dataset has been digitised from a modern road map produced by the Turkish Ministry of Transportation, and made available at http://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Bolgeler/Bolgeler.aspx.

The accuracy of the georeferenced map is c.1km.

Silk Road Caravanserais: the dataset, available at http://www.ciolek.com/owtrad.html, includes some 140 sites, all georeferenced to 100-200m resolution and dated from the 10th to the 16th century AD.

Modern road network: the dataset has been made available at GIS Data Depo (http://data.geocomm.com/catalog/TU/group103.html), and is accurate within 100m.

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Figures

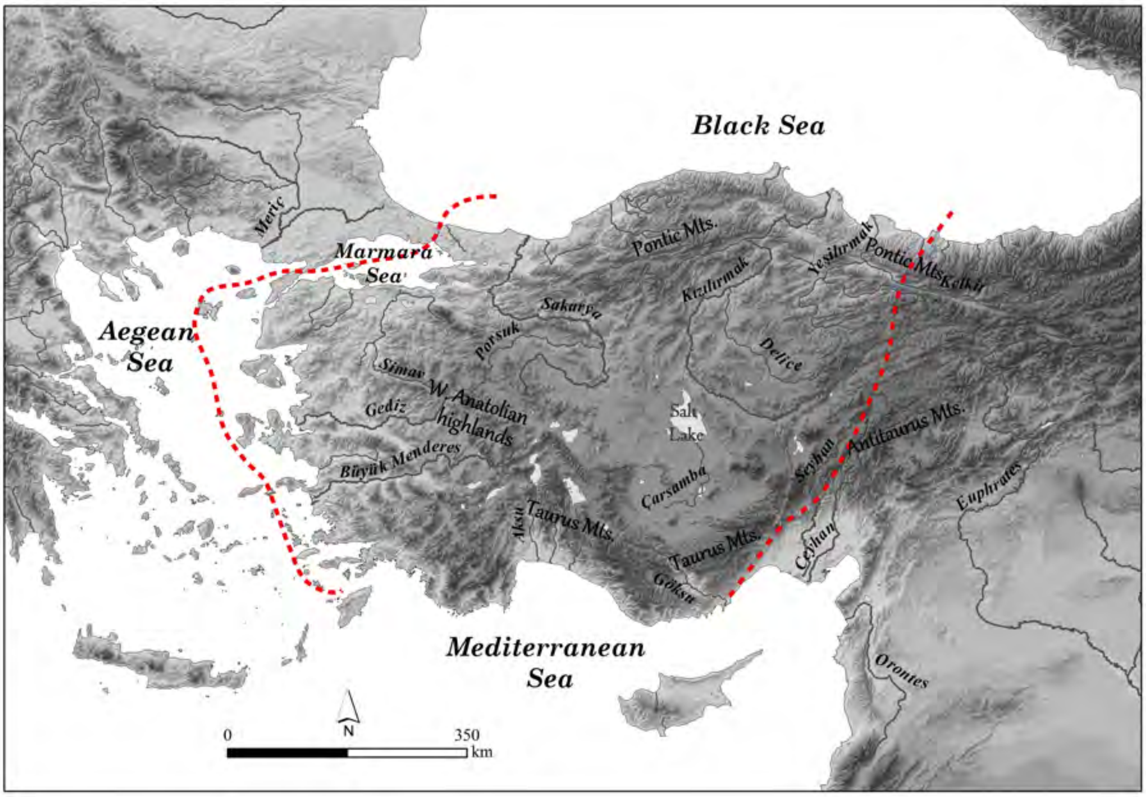


Figure 1.1 Extent of the core study area, with dashed lines marking its approximate boundaries. Major hydrological and topographic features are also indicated.

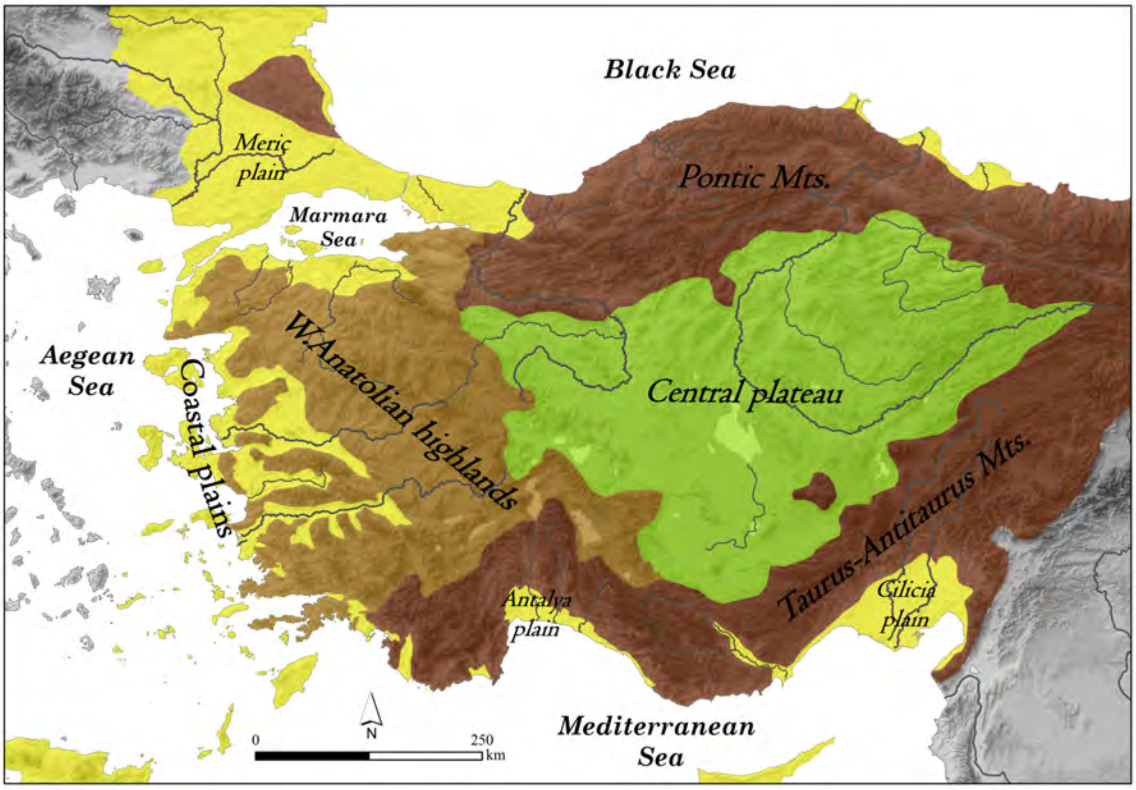


Figure 1.2 Map showing the four major geomorphological units present in the Anatolian peninsula.

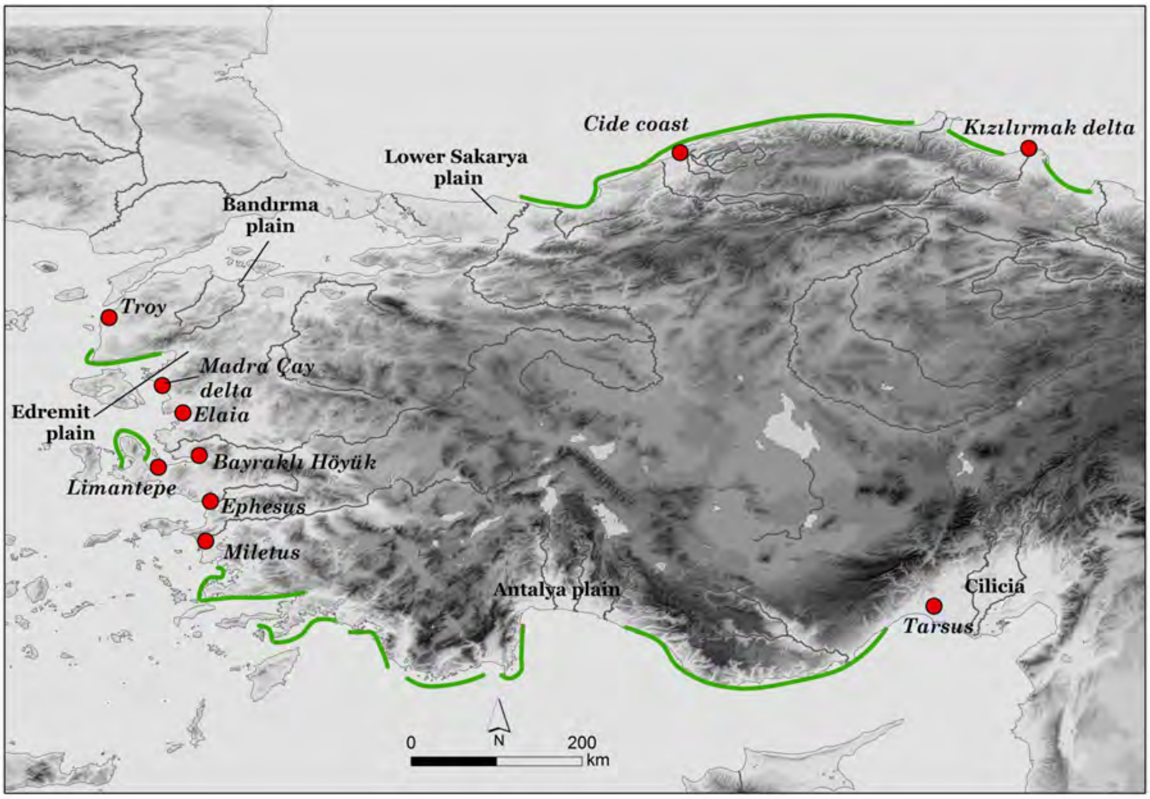


Figure 1.3 Map showing the location of major geoarchaeological studies on coastal progradation (red dots) and of large coastal plains that would have been present also in the Early Bronze Age. Green lines mark coastal areas that would have been difficult to traverse on land because of abrupt high cliffs close to the shore. Data on coastal progradation are taken from Brückner et al.2006; Düring and Glatz 2015; Goodman et al. 2008; Kayan 2014; Kayan and Vardar 2007; Kayan and Öner 2013; Müllenhoff et al.2009; Öner et al.2005; Pint et al.2013; Stock et al.2013; Turoğlu 2010.

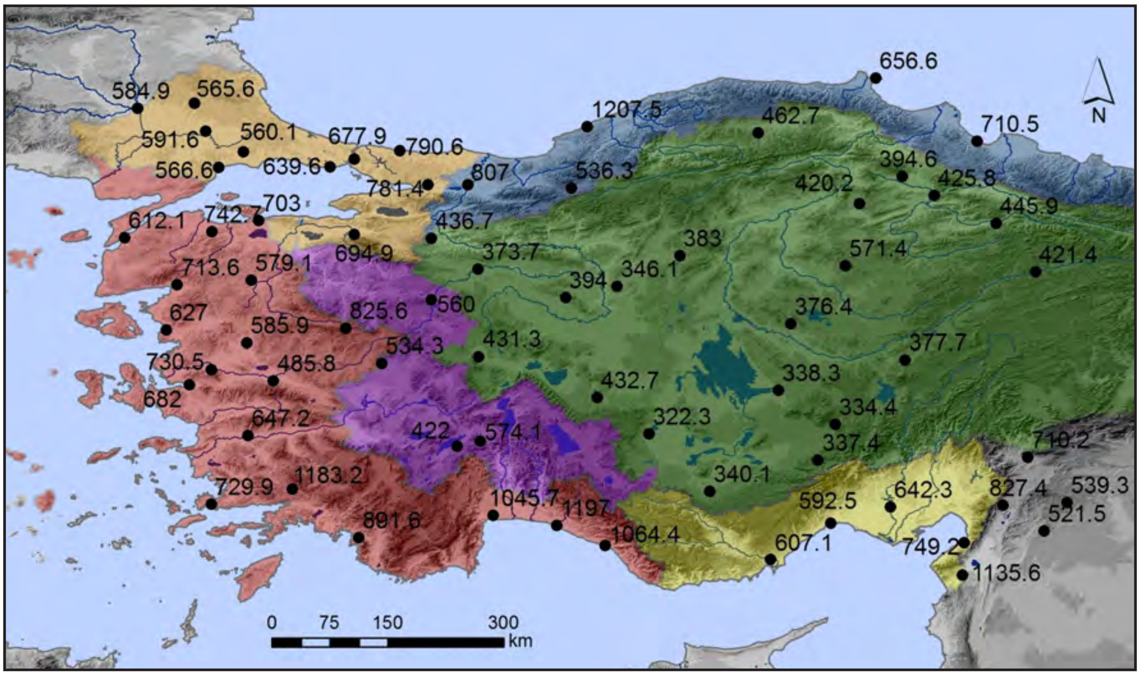


Figure 1.4 Major climate regions in present-day Turkey, together with the average yearly rainfall (in mm) at modern meteorological stations (data from Türkeş 1996:fig.2, table II). Note that, across most of the central plateau, rainfall yearly averages range between 320 and 450mm.

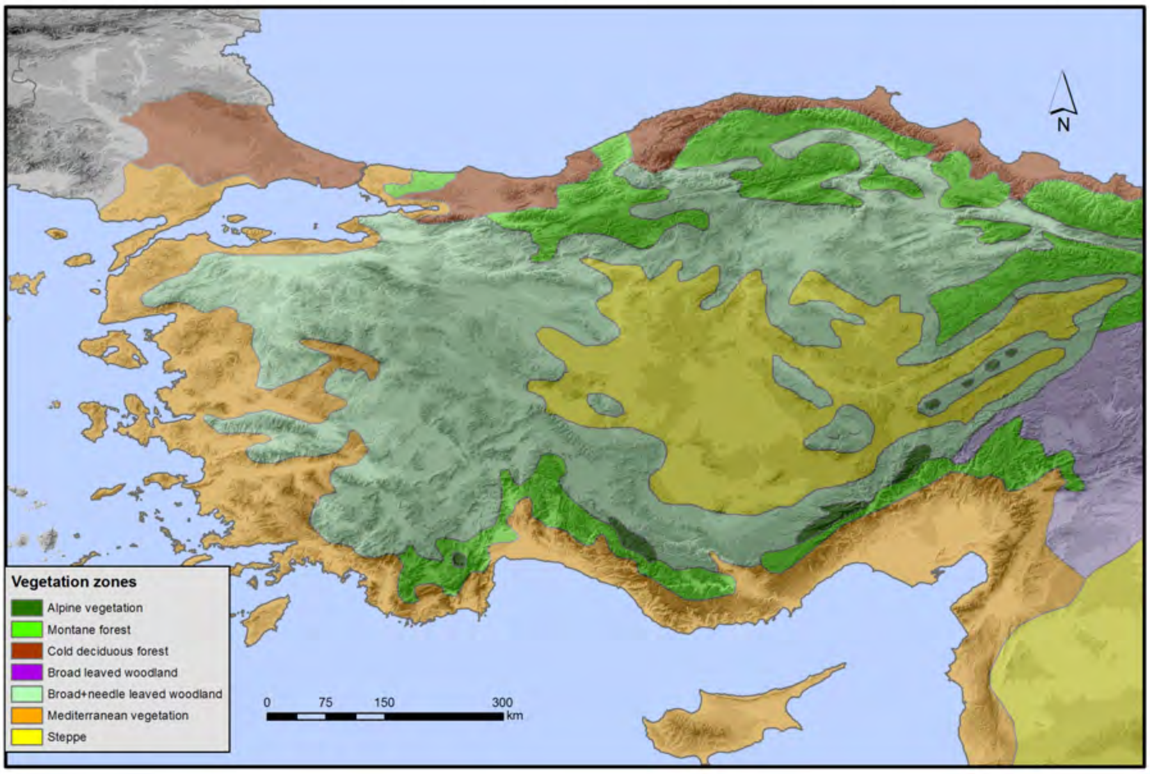


Figure 1.5 Modern vegetation cover in west and central Turkey, assuming no human impact on the natural environment (redrawn from van Zeist and Bottema 1991:fig.4).

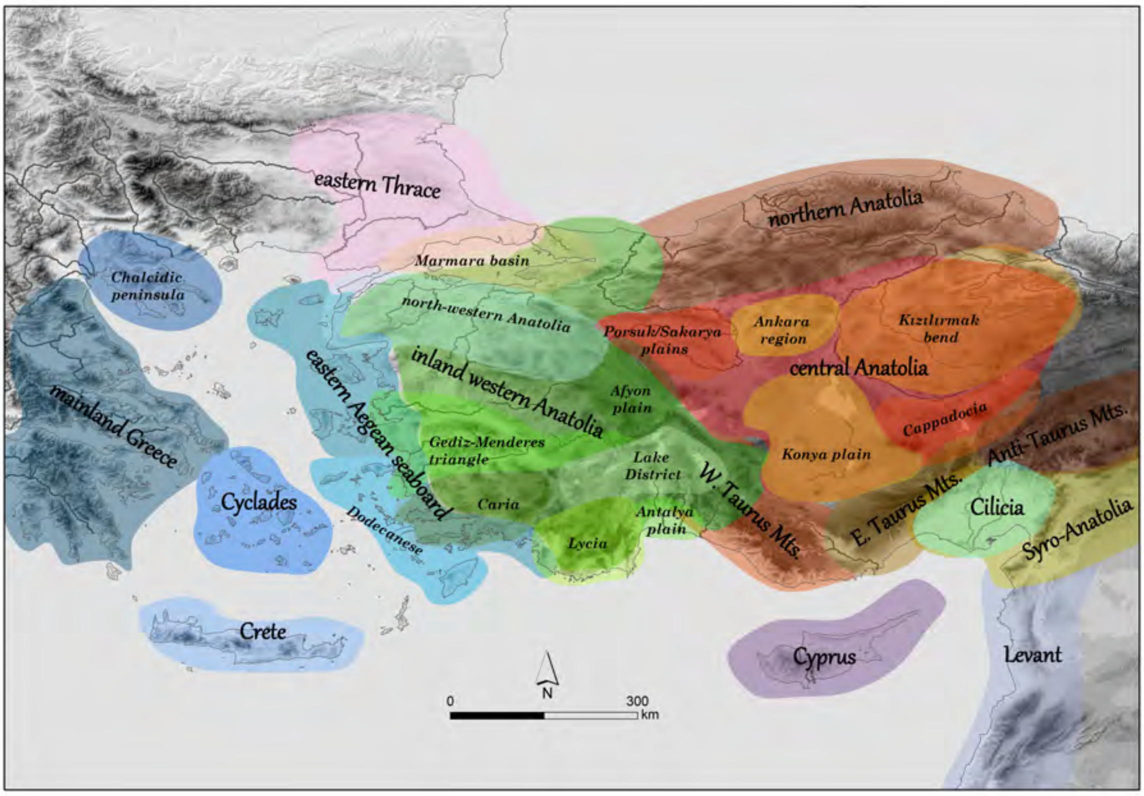


Figure 1.6 Location of major geo-cultural areas mentioned in the text.

Site no.	Site name	Site no.	Site name	Site no.	Site name
104	Acemhöyük	42	Gavurtepe Höyük	29	Limantepe
85	Aharköy	69	Gökhöyük	128	Mahmatlar
38	Ahlatlı Tepecik	130	Göller	145	Maşat Höyük
110	Ahlatlıbel	103	Göltepe	2	Menekşe Çatağı
80	Aizanoi	106	Gordion-Yassıhöyük	149	Mercimektepe
63	Akhan	53	Gümüşlük-Kadıkalesi	14	Methymna
141	Alacahöyük	46	Hacı Mustafa'nın Dami	45	Miletus
152	Alişar Höyük	71	Hacılar Büyük Höyük	5	Myrina
60	Aphrodisias	82	Hacılartepe	18	Ovabayındır
114	Asarcıhöyük/Ilıca	66	Hacımusalar	129	Oymaagaç
58	Asomatos	13	Hanaytepe	26	Panaztepe
54	Assarlık	74	Harmanören/Göndurle	139	Pazarlı
36	Ayasuluk Tepesi	153	Hashöyük	68	Perge
19	Babaköy	24	Helvacı Höyücek	99	Pınarbaşı
70	Bademağacı	44	Heraion	107	Polatlı
33	Bakla Tepe	127	Horoztepe	7	Poliochni
118	Balıbağı	123	İkiztepe	100	Porsuk/Zeive Tepe
21	Ballıca	35	Kabacakiri	134	Resuloğlu
79	Bayındırköy	92	Kaklık Mevkii	132	Salurhöyük
28	Bayraklı Höyük	126	Kaledoruğu/Kavak	40	Sardis
133	Bekaroğlu	140	Kalınkaya	87	Şarhöyük
52	Belentepe	154	Kaman Kalehöyük	105	Sarıyer
43	Bereketli	1	Kanlıgeçit	78	Selçikler
16	Bergama	57	Kap Krio	73	Senirce
11	Beşik-Yassıtepe	8	Karaağaç	55	Seraglio
76	Beycesultan	61	Karahisar Höyük	81	Seyitömer Höyük
115	Bitik Höyük	91	Karaoğlan Mevkii	113	Sincan Höyük
143	Boğazköy/Hattusa	109	Karaoğlanhöyük	166	Sirkeli Höyük
122	Boyabat	67	Karataş	98	Sızma Höyük
135	Boyalı Höyük	108	Karayavşan	162	Soloi Pompeiopolis
12	Bozcaada	146	Kayapınar	158	Sultanhan
23	Bozköy Höyücek	164	Kazanlı	165	Tarsus
83	Bozüyük	89	Keçiçayırı	167	Tatarlı Höyük
25	Buruncuk/Larisa	101	Kemerhisar	125	Tekeköy
138	Büyük Güllücek	102	Kestel	15	Thermi
147	Büyüknefes	161	Kilise Tepe	157	Topaklı Höyük
151	Çadır Höyük	169	Kinet Höyük	3	Toptepe
17	Çandarlı Höyük	120	Kınık	41	Toygar
93	Çavdarlı Höyük	121	Kocagöz/Demircihöyük	10	Troy
112	Cayyolu Höyük	111	Koçumbeli	51	Turgut/Lagina
148	Çengeltepe	97	Konya-Alaeddintepe	27	Ulucak Höyük
31	Çeşme-Bağlararası	96	Konya-Karahöyük	150	Uşaklı Höyük
30	Çeşme-Boyalık	56	Kos	144	Yarıkkaya
50	Çine-Tepecik	6	Koukonisi	65	Yarımhöyük
37	Çukuriçi Höyük	59	Köyceğiz	155	Yassıhöyük (Kırşehir)
49	Damlıboğaz	94	Kubad-abad	64	Yassıhöyük 2 (Burdur)
34	Dedecik-Heybelitepe	84	Küçük Höyük	119	Yassıkaya
86	Demircihöyük	88	Küllüoba	90	Yazılıkaya
168	Domuztepe	159	Kültepe-Karahöyük	137	Yeni Hayat
124	Dündartepe	9	Kumtepe	4	Yenibademli Höyük
22	Ege Gübre	72	Kuruçay	20	Yortan
32	Emborio	95	Kuşluca	136	Yörüklü/Huseyindede
39	Eskibalıkhane	131	Kuşsaray	163	Yumuktepe
142	Eskiyapar	75	Kusura	116	Yumurtatepe
117	Etiyokuşu	48	Iasos	156	Zank Höyük
160	Fıraktın	62	Laodikeia		
77	Gavurkuyusu	47	Latmos		

Figure 1.7 Summary table of known excavated Early Bronze Age sites in west and central Anatolia, ordered by name.

Site no.	Site name	Site no.	Site name	Site no.	Site name
1	Kanlıgeçit	58	Asomatos	115	Bitik Höyük
2	Menekşe Çatağı	59	Köyceğiz	116	Yumurtatepe
3	Toptepe	60	Aphrodisias	117	Etiyokuşu
4	Yenibademli Höyük	61	Karahisar Höyük	118	Balıbağı
5	Myrina	62	Laodikeia	119	Yassıkaya
6	Koukonisi	63	Akhan	120	Kınık
7	Poliochni	64	Yassıhöyük 2 (Burdur)	121	Kocagöz/Demircihöyük
8	Karaağaç	65	Yarımhöyük	122	Boyabat
9	Kumtepe	66	Hacımusalar	123	İkiztepe
10	Troy	67	Karataş	124	Dündartepe
11	Beşik-Yassıtepe	68	Perge	125	Tekeköy
12	Bozcaada	69	Gökhöyük	126	Kaledoruğu/Kavak
13	Hanaytepe	70	Bademağacı	127	Horoztepe
14	Methymna	71	Hacılar Büyük Höyük	128	Mahmatlar
15	Thermi	72	Kuruçay	129	Oymaagaç
16	Bergama	73	Senirce	130	Göller
17	Çandarlı Höyük	74	Harmanören/Göndurle	131	Kuşsaray
18	Ovabayındır	75	Kusura	132	Salurhöyük
19	Babaköy	76	Beycesultan	133	Bekaroğlu
20	Yortan	77	Gavurkuyusu	134	Resuloğlu
21	Ballıca	78	Selçikler	135	Boyalı Höyük
22	Ege Gübre	79	Bayındırköy	136	Yörüklü/Huseyindede
23	Bozköy Höyücek	80	Aizanoi	137	Yeni Hayat
24	Helvacı Höyücek	81	Seyitömer Höyük	138	Büyük Güllücek
25	Buruncuk/Larisa	82	Hacılartepe	139	Pazarlı
26	Panaztepe	83	Bozüyük	140	Kalınkaya
27	Ulucak Höyük	84	Küçük Höyük	141	Alacahöyük
28	Bayraklı Höyük	85	Aharköy	142	Eskiyapar
29	Limantepe	86	Demircihöyük	143	Boğazköy/Hattusa
30	Çeşme-Boyalık	87	Şarhöyük	144	Yarıkkaya
31	Çeşme-Bağlararası	88	Küllüoba	145	Maşat Höyük
32	Emborio	89	Keçiçayırı	146	Kayapınar
33	Bakla Tepe	90	Yazilıkaya	147	Büyüknefes
34	Dedecik-Heybelitepe	91	Karaoğlan Mevkii	148	Çengeltepe
35	Kabacakiri	92	Kaklık Mevkii	149	Mercimektepe
36	Ayasuluk Tepesi	93	Çavdarlı Höyük	150	Uşaklı Höyük
37	Çukuriçi Höyük	94	Kubad-abad	151	Çadır Höyük
38	Ahlatlı Tepecik	95	Kuşluca	152	Alişar Höyük
39	Eskibalıkhane	96	Konya-Karahöyük	153	Hashöyük
40	Sardis	97	Konya-Alaeddintepe	154	Kaman Kalehöyük
41	Toygar	98	Sızma Höyük	155	Yassihöyük (Kırşehir)
42	Gavurtepe Höyük	99	Pınarbaşı	156	Zank Höyük
43	Bereketli	100	Porsuk/Zeive Tepe	157	Topaklı Höyük
44	Heraion	101	Kemerhisar	158	Sultanhan
45	Miletus	102	Kestel	159	Kültepe-Karahöyük
46	Hacı Mustafa'nın Dami	103	Göltepe	160	Fıraktın
47	Latmos	104	Acemhöyük	161	Kilise Tepe
48	Iasos	105	Sarıyer	162	Soloi Pompeiopolis
49	Damlıboğaz	106	Gordion-Yassıhöyük	163	Yumuktepe
50	Çine-Tepecik	107	Polatlı	164	Kazanlı
51	Turgut/Lagina	108	Karayavşan	165	Tarsus
52	Belentepe	109	Karaoğlanhöyük	166	Sirkeli Höyük
53	Gümüşlük-Kadıkalesi	110	Ahlatlıbel	167	Tatarlı Höyük
54	Assarlık	111	Koçumbeli	168	Domuztepe
55	Seraglio	112	Cayyolu Höyük	169	Kinet Höyük
56	Kos	113	Sincan Höyük		
57	Kap Krio	114	Asarcıhöyük/Ilıca		

Figure 1.8 Summary table of known excavated Early Bronze Age sites in west and central Anatolia, ordered by number.

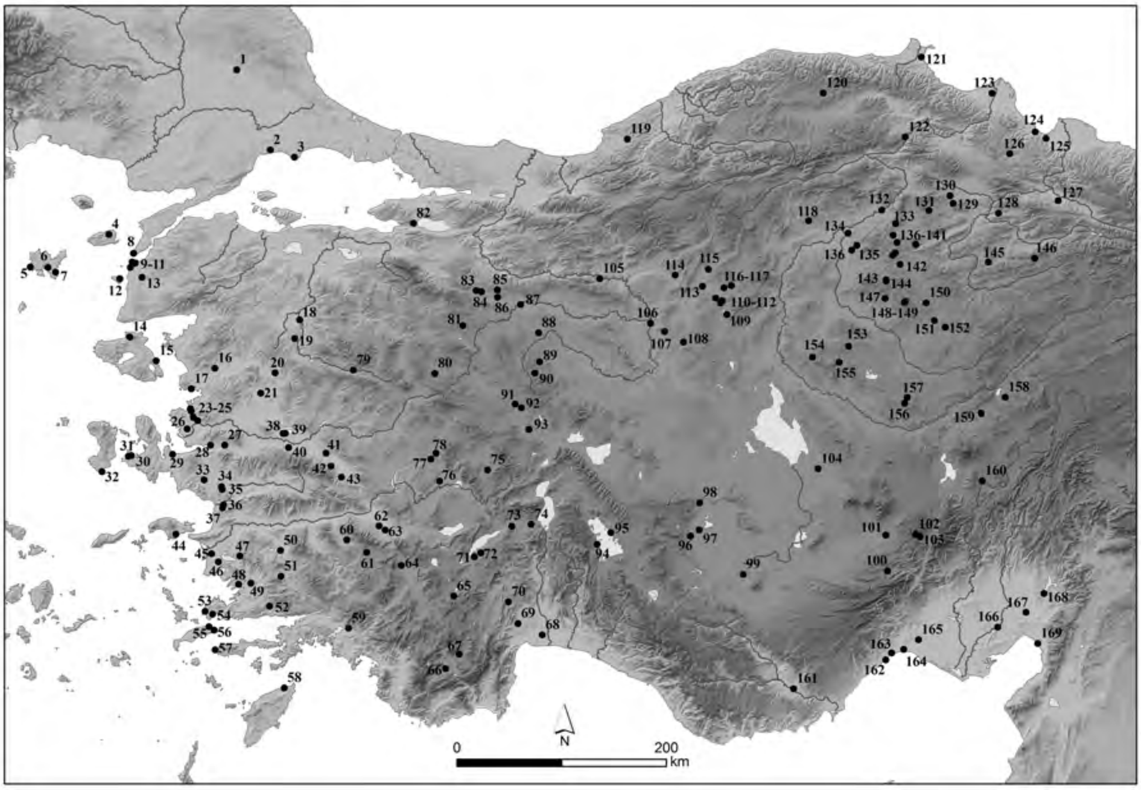


Figure 1.9 Location of excavated Early Bronze Age sites in west and central Anatolia. Site numbers refer to tables in figures 1.7 and 1.8.

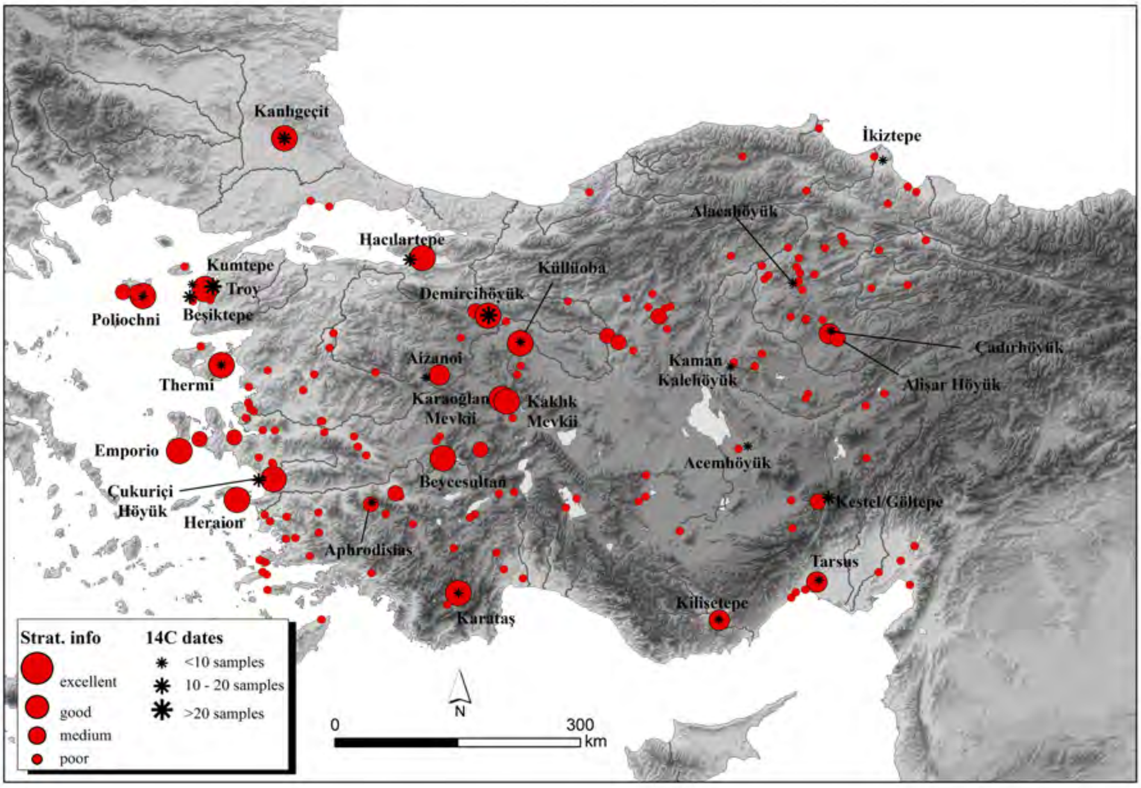


Figure 1.10 Map showing excavated EBA sites and the level of published details regarding their stratigraphic sequence (data from figure 1.21), together with the existence of radiocarbon samples from documented archaeological levels (data from figure 1.13).

Grave	Lab.no	uncalibrated	calibrated (1 sigma)	calibrated (2 sigma)
L	unk	4227 ± 121 BP	3001-2594 cal BC	3313-2476 cal BC
S	ETH 39353	4160 ± 35 BP	2872-2679 cal BC	2880-2628 cal BC
A	ETH 39355	3950 ± 45 BP	2564-2349 cal BC	2572-2300 cal BC
A1	ETH 39352	3905 ± 45 BP	2463-2346 cal BC	2477-2289 cal BC

Figure 1.11 Radiocarbon dates of Alacahöyük "Royal" graves A, A1, L and S (Yalçın Ü 2011:fig.2; Yalçın and Yalçın 2013:44). Samples were taken from wood fragments inside the shaft of several metal objects.

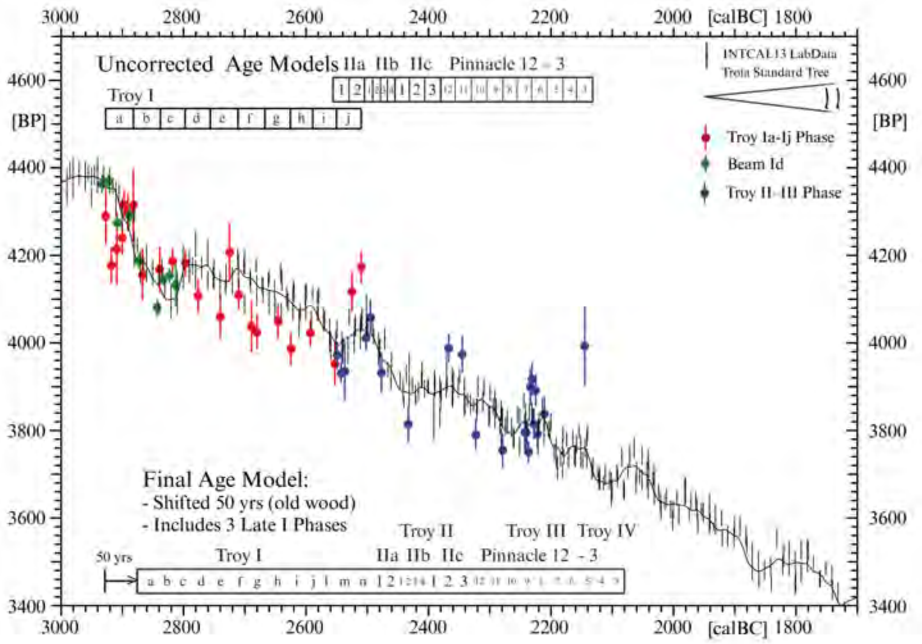


Figure 1.12 Combined stratigraphic succession of 14C-ages for Early Bronze Age Troy I-III (from Weninger and Easton 2014:fig.16).

Area	Site	early 3rd	mid 3rd	late 3rd	Total	Publ.Strat.	Reference
NW Anatolia	Troy	24	16	29	**69**	yes	Weninger and Easton 2014
	Beşiktepe	16	0	0	**16**	yes	Korfmann and Kromer 1993
	Hacılartepe	11	0	0	**11**	yes	Eimermann 2008
	Thermi	1	0	0	**1**	yes	Begemann et al. 1992
	Poliochni	2	0	0	**2**	yes	Begemann et al.1992
	Kumtepe	6	0	0	**6**	yes	Korfmann et al.1995
	Aizanoi	2	0	0	**2**	yes	Lochner and Ay 2001
	Gümüşköy mine	0	1	1	**2**	no	Wagner and Öztunalı 2000
Gediz-Büyük Menderes	Aphrodisias	0	0	7	**7**	yes	Sharp-Joukowski 1986
	Çukuriçi Höyük	10	0	0	**10**	yes	Horejs 2014
SW Anatolia	Karataş	7	0	0	**7**	yes	Warner 1994
W central plateau	Demircihöyük	60	6	0	**66**	yes	Weninger 1987
	Küllüoba	1	1	2	**4**	yes	Efe and Fidan 2008
S central plateau	Acemhöyük	0	2	5	**7**	no	Öztan and Arbuckle 2013
Kızılırmak bend	Çadırhöyük	5	0	0	**5**	yes	Gorny et al. 2002
	Alacahöyük	2	3	3	**8**	no	Yalçın and Yalçın 2013
	Kaman Kalehöyük	0	0	2	**2**	yes	Omura 2002
	Derekutuğun mine	9	11	2	**22**	yes	Yalçın and Maass 2013
E Taurus Mts.	Kestel/Göltepe	2	12	6	**20**	no	Yener 2000
Thrace	Kanlıgeçit	0	8	7	**15**	yes	Özdoğan and Parzinger 2012
Black Sea	İkiztepe	4	0	3	**7**	no	Alkım et al.2003
Cilicia	Tarsus	0	5	0	**5**	no	Özyar 2005
	Kilisetepe	0	0	2	**2**	yes	Postgate and Thomas 2007
	TOTAL	**162**	**65**	**69**	**296**		

Figure 1.13 Summary table of published radiocarbon samples correlated with references and divided by site, period and region. The "Published stratigraphy" column indicates whether the samples are discussed in sufficient detail and in relation to the site's stratigraphy within their respective publications.

Abs.dates	Rel.Chrono	Thrace	Coastal western Anatolia				Inland western Anatolia			
		Kanlıgeçit	Troy	Liman	Emborio	Heraion	Beycesultan	Aphrodisias	Karataş	Kusura
	MBA	aband.								
			V	↑	gap	V	↑	↑		↑
2000 BC							X			C
	EB IIIb	1	IV	B IV-1		IV	XI		gap	
							XII	Acr.tr.3 II		
					I					
		2a	IIId	B IV-2		III				
				B V-1a				Acr.tr.3 IV		
2250 BC		2b	IIg	B V-1b						
							gap			gap
	EB IIIa					II		Acr.tr.3 VII	VI:2	
		2c								
			IIc		II				VI:1	
						I	XIII			
		3								
2500 BC	EB IIb		IIa-b	B V-2			XIV		V:3	
									V:2	
					III		XV		V:1	
		4								B
			Ig-k							
	EB IIa									
				B V-3			XVI		IV	
2750 BC					IV			↓		
									III	
			Id-e	B VI-1			XVII			
				A VI-1c						
	EB Ib	↓	Ia-c						I/II	
					V		XVIII			
							XIX			
3000 BC										A
				A VI-1d					gap	
							gap			
	EB Ia			A VII						
					VI					
									Bağbaşı	
3250 BC							XX			

Figure 1.14 Chronological chart of the Early Bronze Age iAnatolia, showing the correlation between different stratigraphic levels at main excavated sites and their suggested absolute date (modified from Türkteki 2010:table 11).

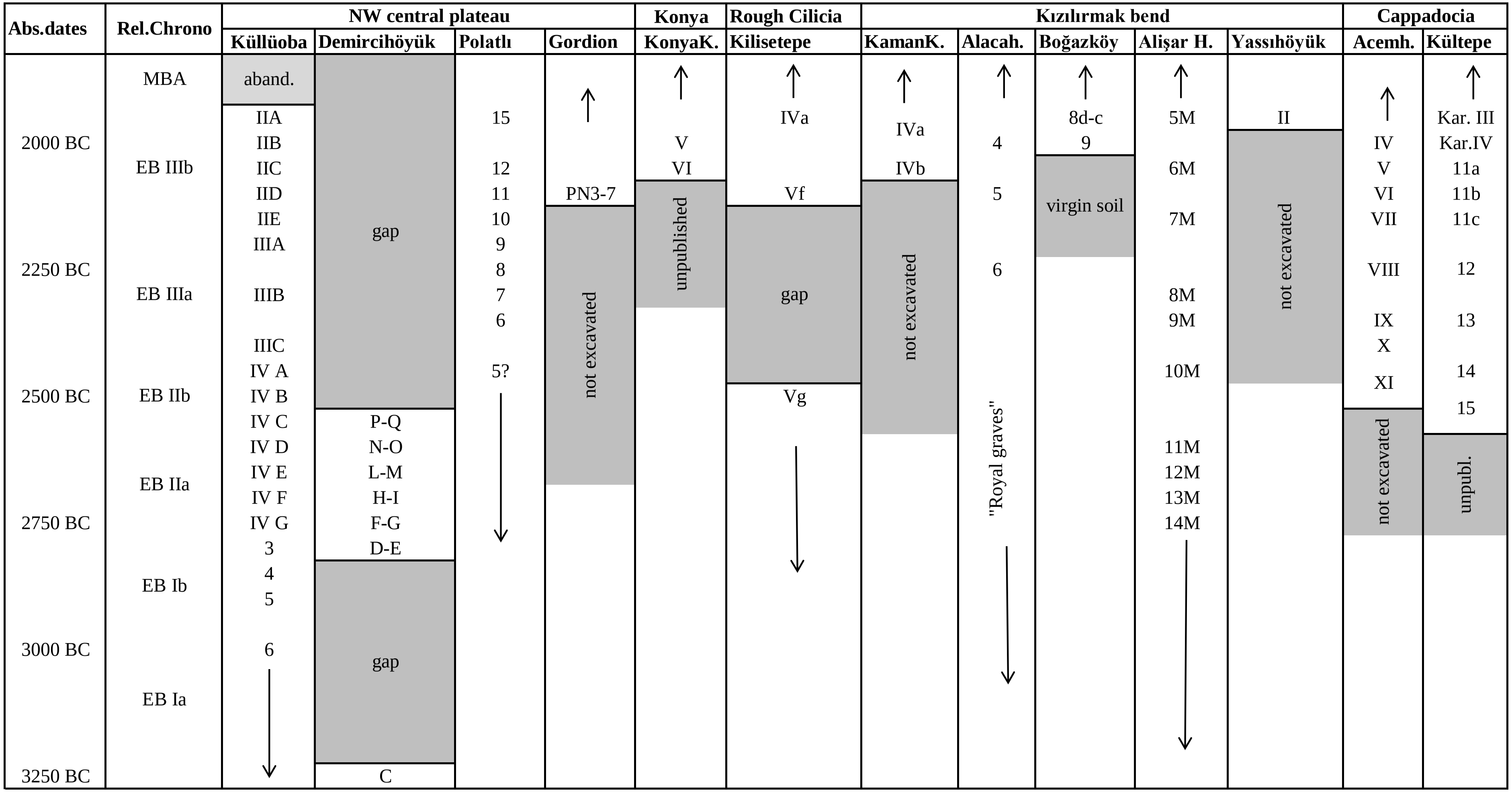


Figure 1.14 (continued) Chronological chart of the Early Bronze Age in Anatolia, showing the correlation between different stratigraphic levels at main excavated sites and their suggested absolute date (modified from Türkteki 2010:table 11). Note the lack of stratified levels covering pre-2500 BC phases in central Anatolian sites.

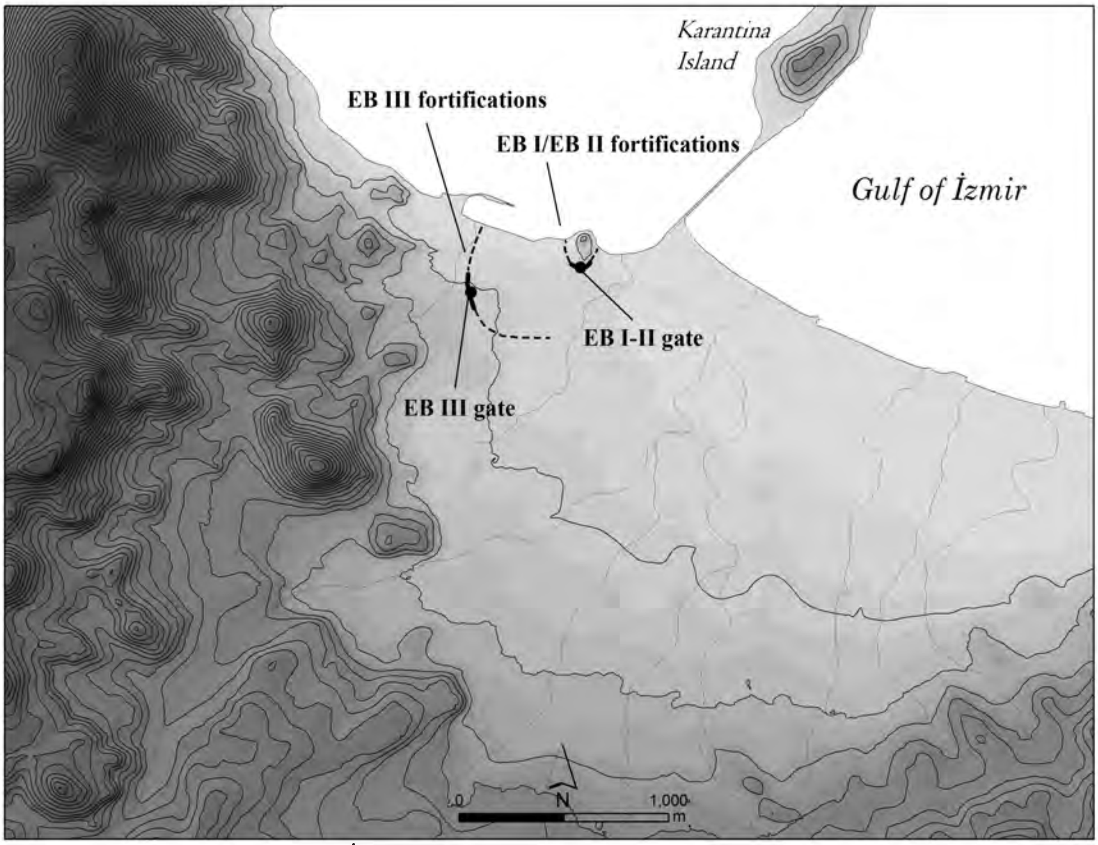


Figure 1.15 Plan of Liman Tepe (İzmir, eastern Aegean coast), documenting the expansion of the settlement from c.5ha in the early EBA (c.3000-2500 BC) to c.15-20ha in the later EBA (c.2500-2200 BC). The reconstruction is based on the location of known tracts of the internal and external fortification walls (cf. Erkanal et al.2012:map 1; Ersoy et al.2011:fig.5).

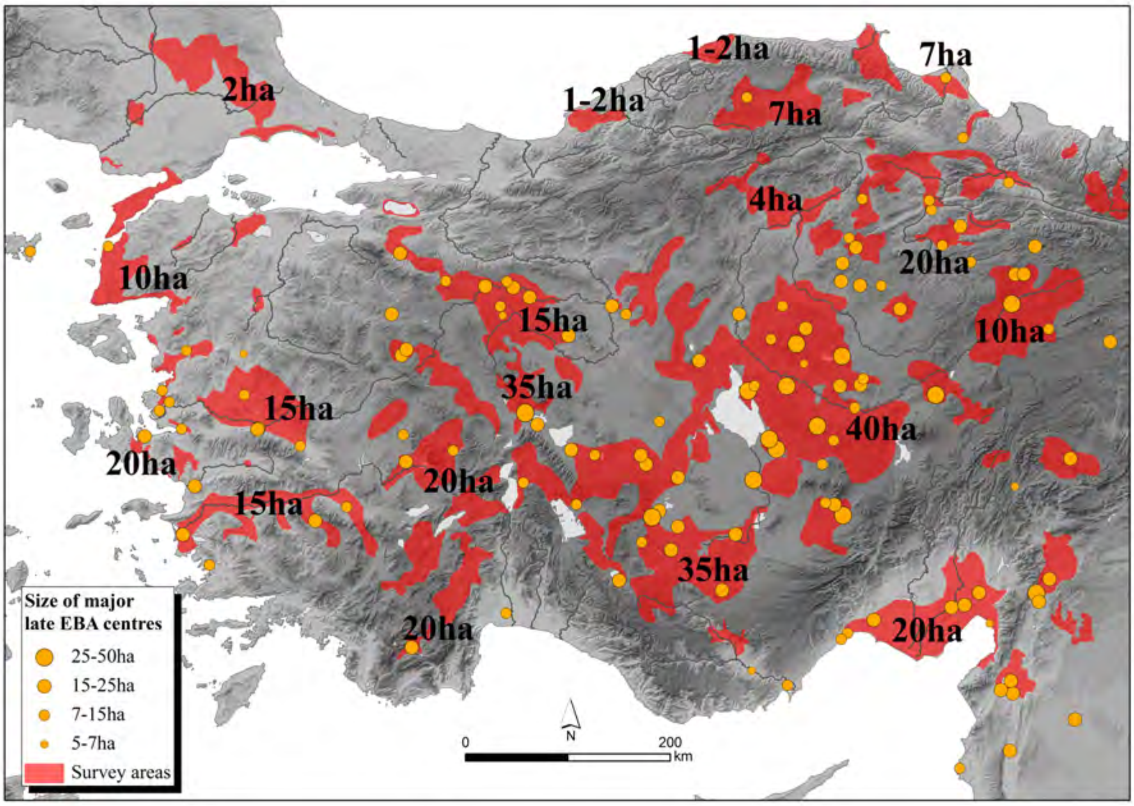


Figure 1.16 Map showing the estimated size of the largest late EBA settlements documented in different survey and excavation projects (adapted from Çevik 2007:fig.5 and Massa 2014a:fig.10).

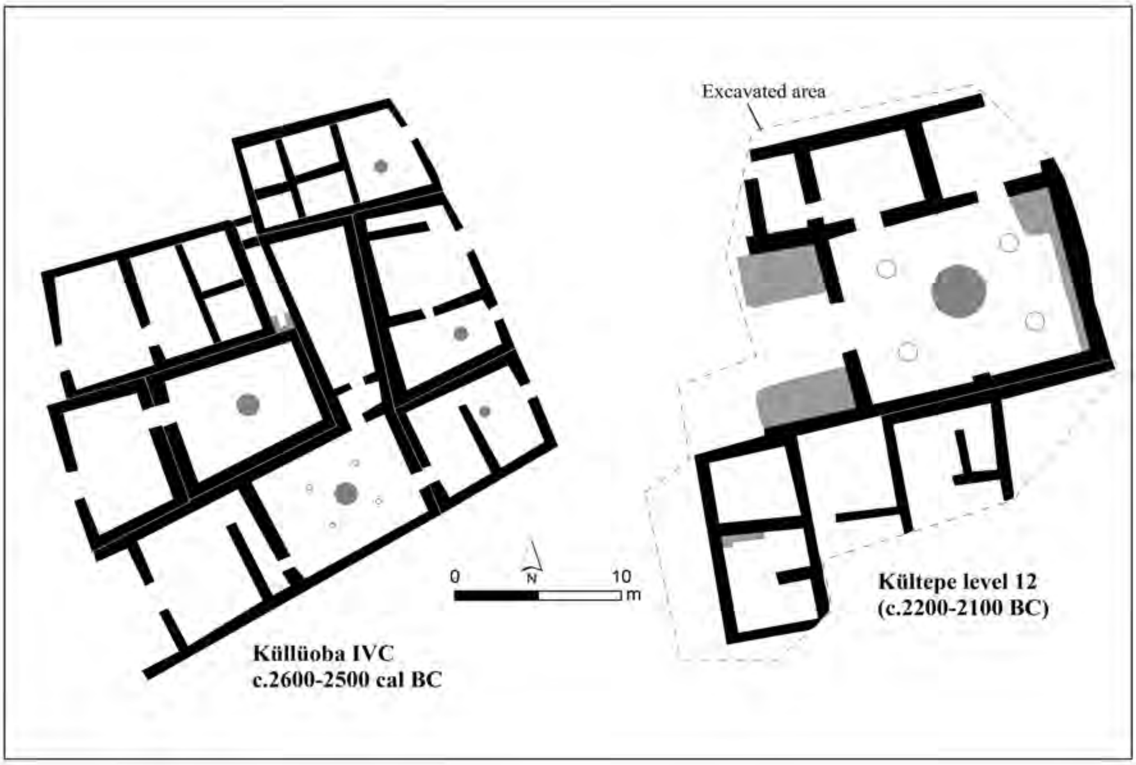


Figure 1.17 Comparison between the public buildings of Küllüoba IV C ("Complex II", c.2600-2490 cal BC, Efe and Fidan 2008, fig.3) and Kültepe 12 (c.2200-2100 BC, Özgüç 1963, plan 1). While the Kültepe "temple" (?) is only partially excavated, there seem to be close similarities with regards to the (megaroid) plan of the central room, furnished with a large central hearth and surrounded by four small wooden pillars in both cases. Note that Kültepe's central room (11x13m= 143m2) is roughly double than Küllüoba's central room (7x9m=63m2).

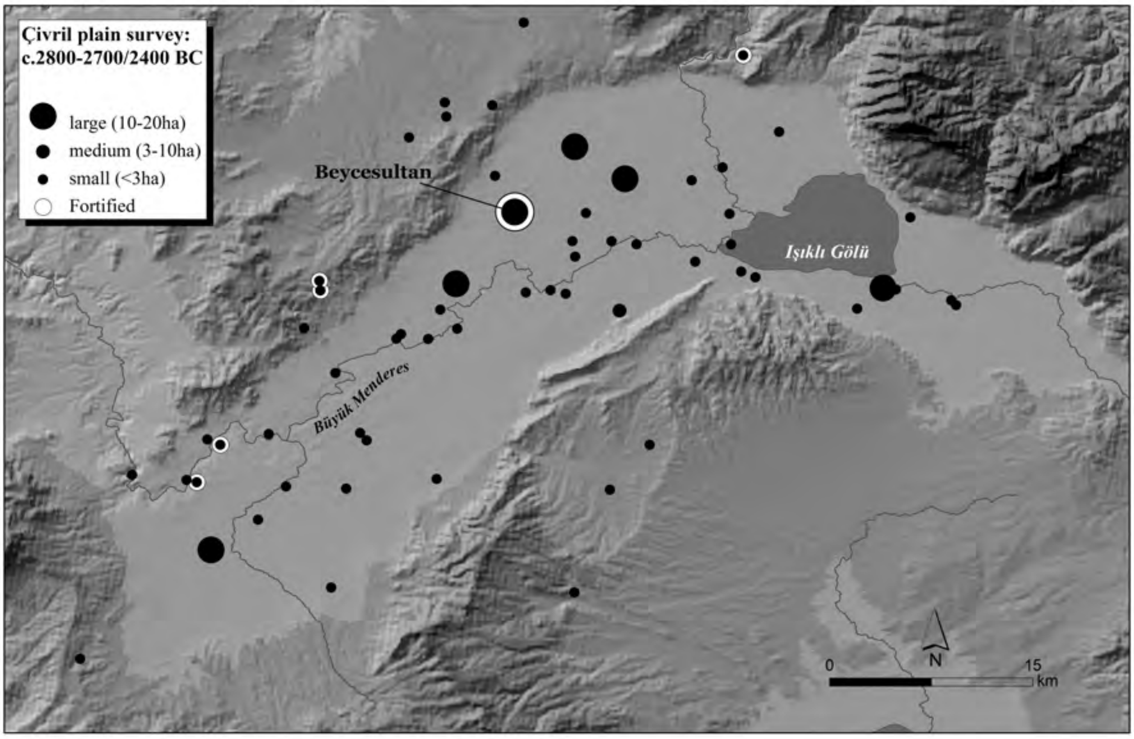


Figure 1.18 Map of the Çivril plain showing the location of settlements (c.2800-2700/2400 BC) detected by the Beycesultan Survey Project (data from Abay 2011). Note the location of fortified sites at the entrances of the valley and in proximity of fords over the Büyük Menderes (marked by twin mounds on either side of the river).

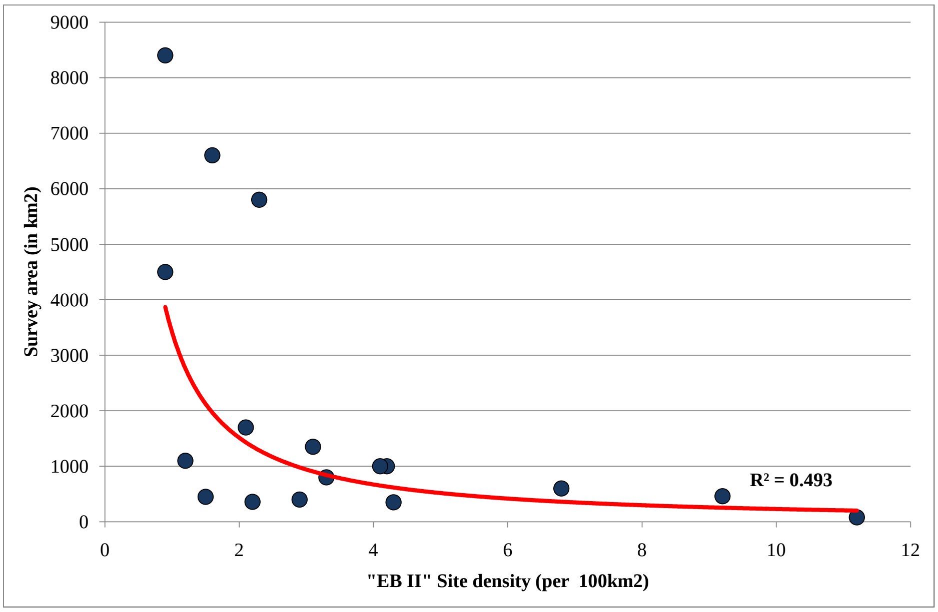


Figure 1.19 Density of "EB II" (c. 2800/2700-2400 BC) settlements in 18 better-published survey projects across west and central Anatolia. The "EB II" horizon has been chosen here for comparison because its pottery assemblages are generally better understood than the "EB I" or "EB III" ones; it further seems to represent the apogee of population densities in the 3rd millennium BC, before the impact of the 4.2ka event. Even though the density of "EB II" sites in different projects may be dependent on numerous factors including survey methodology, depositional and post-depositional processes, the number of days spent on the field and personal expertise, there seems to be a clear negative correlation between the spatial extent of the survey projects (in km2) and the density of EBA sites, with smaller areas normally yielding higher-density results.

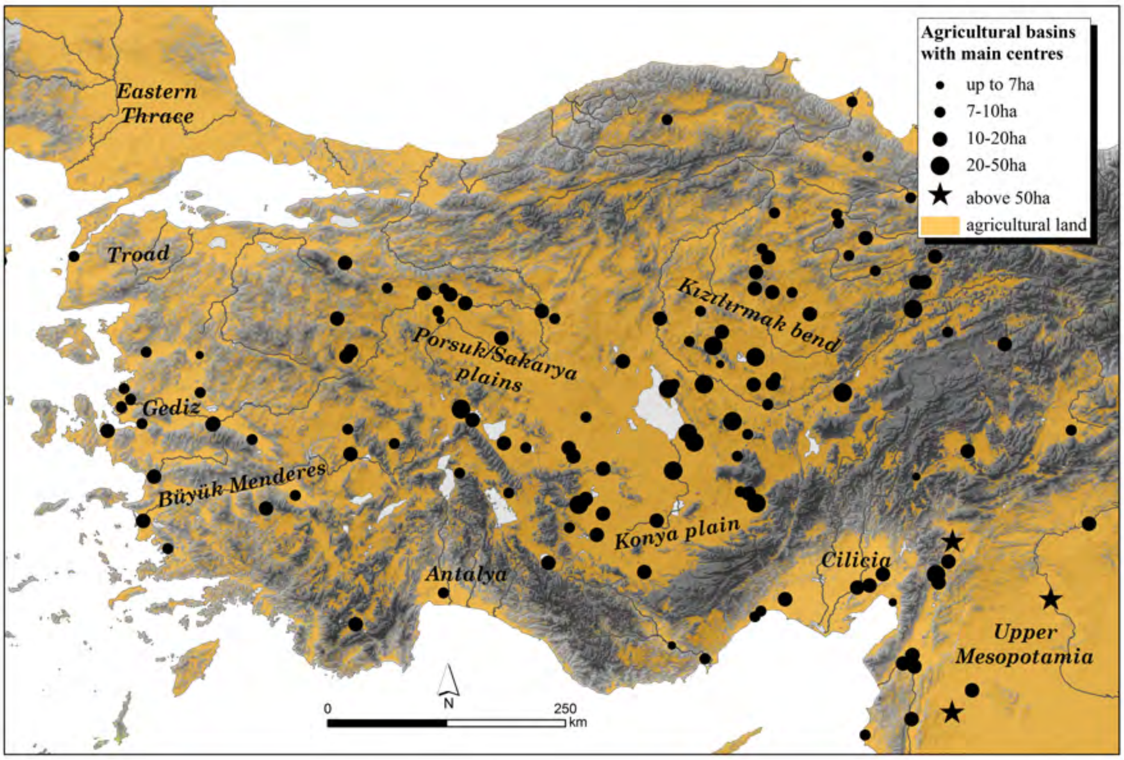


Figure 1.20 The extent of major agricultural basins (here roughly estimated as all land below 12 degrees of slope and below 1500m of elevation, i.e. the approximate upper limits of plough-driven intensive agriculture) is marked in orange. The location of major EBA centres known from survey and excavation is also shown as black dots. Note that there is a fair agreement between the location of major centres and that of major agricultural basins.

Site_no	SiteName	Site type	Exc. area (m2)	Invest. phases (cent. BC)				Publication assessment								Site impact
				33-29	29-26	26-22	22-19	A	B	C	D	E	F	G	Total	
10	Troy	S	> 5.000		3	5	3	5	5	5	5	5	5	5	35	very high
86	Demircihöyük	S/C	500-1.000	2	5			5	5	5	5	5	5	5	35	very high
1	Kanlıgeçit	S	> 2.000		2	5	3	5	5	4	5	5	5	5	34	very high
67	Karataş	S/C	> 2.000	2	4	5		5	5	5	4	5	5	5	34	very high
37	Çukuriçi Höyük	S	500-1.000	3	5			5	5	3	5	5	4	5	32	very high
7	Poliochni	S	> 2.000	2	3	5	1	5	5	5	3	5	5	3	31	very high
76	Beycesultan	S	500-1.000	2	3	1	3	5	5	3	2	5	5	5	30	very high
32	Emborio	S	> 2.000	2	3	4	1	5	5	2	2	5	5	5	29	very high
88	Küllüoba	S	> 5.000	2	1	5	2	5	5	2	2	5	4	5	28	very high
15	Thermi	S	> 2.000		5			5	5	3	1	5	4	5	28	very high
152	Alişar Höyük	S	500-1.000	1	2	4	3	3	5	2	4	4	5	5	28	very high
165	Tarsus	S	500-1.000	1	2	4	3	4	3	3	2	5	5	5	27	very high
60	Aphrodisias	S	500-1.000	2	2	3	3	2	5	5	5	5	5	5	32	high
48	Iasos	C	500-1.000		3	2		2	4	5	3	5	4	3	26	high
44	Heraion	S	> 2.000	1	1	4	3	5	4	2	0	5	4	5	25	high
102	Kestel	M	500-1.000	1	4	4		2	4	4	2	5	4	4	25	high
103	Göltepe	S	> 2.000	1	4	4		3	3	2	2	4	5	5	24	high
75	Kusura	S/C	> 2.000	2	3		4	3	4	2	0	5	4	4	22	high
20	Yortan	C	500-1.000		3	4		1	3	2	0	5	4	5	20	high
161	Kilise Tepe	S	<100	1	1	2	3	5	4	3	3	4	4	5	28	medium
82	Hacılartepe	S/C	100-500		2			5	5	2	2	5	4	4	27	medium
151	Çadır Höyük	S	100-500	3		1		5	4	3	4	3	4	4	27	medium
84	Küçük Höyük	C	500-1.000		3			5	5	5	1	4	3	4	27	medium
91	Karaoğlan Mevkii	S	100-500		4			4	5	3	0	4	3	4	23	medium
92	Kaklık Mevkii	S/C	> 2.000	3		3		4	5	2	0	3	3	4	21	medium
29	Limantepe	S	> 2.000	2	5	3	2	3	2	1	3	5	4	3	21	medium
141	Alacahöyük	S/C	500-1.000	1	2	4	3	2	4	4	1	0	5	4	20	medium
62	Laodikeia	S/C	100-500	2	1	3	2	3	3	3	2	4	3	2	20	medium
123	İkiztepe	S/C	> 2.000	5	1	1	3	2	3	3	2	2	5	3	20	medium
81	Seyitömer Höyük	S	> 5.000			4	5	2	3	2	3	4	3	3	20	medium
140	Kalınkaya	S/C	100-500	2		3		2	3	4	2	3	3	3	20	medium
80	Aizanoi	S	<100		4			4	5	4	0	2	3	1	19	medium
107	Polatlı	S	<100		2	2	2	3	4	2	0	3	3	4	19	medium
71	Hacılar Büyük Höyük	S/C	> 2.000		4	1		2	3	3	0	3	4	4	19	medium
155	Yassıhöyük (Kırşehir)	S	500-1.000				3	2	3	2	2	4	3	3	19	medium
72	Kuruçay	S	500-1.000		3			2	3	2	2	3	4	3	19	medium
11	Beşik-Yassıtepe	S	500-1.000		4			3	4	2	2	2	2	4	19	medium
31	Çeşme-Bağlararası	S	100-500			3		3	4	2	0	4	3	3	19	medium
127	Horoztepe	S/C	<100			3		2	4	4	0	1	4	4	19	medium
134	Resuloğlu	S/C	> 2.000			3	2	2	3	2	3	3	3	3	19	medium
154	Kaman Kalehöyük	S	<100				2	2	4	1	3	3	3	2	18	medium
74	Harmanören/Göndurle	C	> 2.000			4	2	1	3	3	2	3	3	3	18	medium
70	Bademağacı	S	> 5.000		2	4	1	2	4	2	0	3	3	4	18	medium
27	Ulucak Höyük	S/C	unk			3	2	2	2	3	1	3	3	4	18	medium
89	Keçiçayırı	S	100-500			4		2	4	2	0	3	3	3	17	medium
112	Cayyolu Höyük	S	100-500		2	4	1	3	4	1	0	3	2	4	17	medium
144	Yarıkkaya	S	100-500	3				3	3	1	2	3	2	3	17	medium
9	Kumtepe	S	<100	4				3	2	0	2	3	3	3	16	medium
5	Myrina	S	100-500		3	4	3	3	3	2	2	2	2	2	16	medium

Figure 1.21 Synoptic table providing an overview of site quality assessment of excavated Early Bronze Age sites under analysis. “**Site type**”: S= settlement, C= cemetery, S/C= settlement+cemetery, M= mine, H= hoard, NS= cave (natural sanctuary?). “**Exc.area**” is a rough estimate of the (horizontal) extent of EBA trenches at site (in m2). “**Investigated phases**” assesses the intensity of investigation for each chronological phase at the site. “**Publication assessment**” estimates the impact of the site-based corpus of publications according to several criteria: A) the level of detail provided in the publication with regards to the stratigraphic sequence; B) the level of detail on the discussion of the archaeological features and their associated contexts, and the possibility to independently re-assess them; C) the assessment of the archaeological assemblages within their finding context; D) the presence of specialist studies (e.g. archaeometallurgy, environmental analysis, palaeobotany, zooarchaeology, artefact analysis, osteology, etc.); E) the presence of a formal interpretative assessment of the site as a whole and its broader significance; F) the size of the publication(s) and G) the accessibility of the publications in terms of language employed and their public availability. Each parameter has a range from 0 (low) to 5 (excellent). “**Site impact**” provides a synthetic qualitative assessment of the different criteria.

Site_no	SiteName	Site type	Exc. area (m2)	Invest. phases (cent. BC)				Publication assessment								Site impact
				33-29	29-26	26-22	22-19	A	B	C	D	E	F	G	Total	
119	Yassıkaya	NS	<100		4			2	3	1	0	4	3	3	16	medium
111	Koçumbeli	S	100-500		4			2	4	2	0	2	3	2	15	medium
39	Eskibalıkhane	C	<100		3			1	3	3	0	2	3	3	15	medium
106	Yassıhöyük (Gordion)	S	<100				2	3	3	2	0	0	3	3	14	medium
58	Asomatos	S	100-500			4		2	4	2	0	2	1	3	14	medium
159	Kültepe	S	500-1.000			3	4	2	2	1	0	4	2	3	14	medium
163	Yumuktepe	S	unk	2			3	2	1	1	0	3	2	5	14	medium
132	Salurhöyük	C	100-500				4	1	3	3	0	2	3	2	14	medium
30	Çeşme-Boyalık	C	<100			4		0	3	3	0	3	2	3	14	medium
33	Bakla Tepe	S/C	> 5.000	5	4	4		2	3	1	0	3	2	2	13	medium
38	Ahlatlı Tepecik	C	100-500		3	2		1	2	4	0	0	3	3	13	medium
21	Ballıca	C	<100			3		2	3	3	0	0	2	2	12	medium
12	Bozcaada	S/C	<100		2			2	2	3	0	0	2	3	12	medium
4	Yenibademli Höyük	S	500-1.000		2	3		2	2	0	0	2	3	3	12	medium
110	Ahlatlıbel	S	> 2.000			3		1	4	2	0	0	3	2	12	medium
90	Yazılıkaya	C	<100					1	3	2	0	2	2	2	12	medium
122	Boyabat	S	<100			2	2	2	3	1	0	1	2	2	11	medium
6	Koukonisi	S	100-500	2	2	2		3	2	1	0	2	2	1	11	medium
8	Karaağaç	S	100-500	1	2			2	2	1	0	0	3	3	11	medium
19	Babaköy	C	100-500		2			0	3	3	0	0	2	3	11	medium
47	Latmos	NS	<100					0	3	1	0	3	4	2	13	low
68	Perge	S	100-500					2	2	1	0	2	3	2	12	low
50	Çine-Tepecik	S/C	100-500					1	2	2	0	0	2	3	10	low
117	Etiyokuşu	S	100-500					1	3	1	0	0	3	2	10	low
61	Karahisar Höyük	S/C	unk			3	1	1	2	1	0	1	3	2	10	low
149	Mercimektepe	S	unk				2	2	2	0	0	1	2	2	9	low
142	Eskiyapar	S	100-500			1	2	1	0	2	0	0	3	3	9	low
69	Gökhöyük	S/C	unk					1	1	2	0	0	2	3	9	low
145	Maşat Höyük	S	100-500			2		1	1	1	0	1	3	2	9	low
148	Çengeltepe	S	100-500					2	2	0	0	0	2	2	8	low
28	Bayraklı Höyük	S	100-500					1	1	1	1	0	1	3	8	low
13	Hanaytepe	S	unk					1	2	2	0	0	1	2	8	low
118	Balıbağı	C	100-500				3	0	2	2	0	1	2	1	8	low
143	Boğazköy/Hattusa	S	100-500				3	3	2	0	0	0	1	1	7	low
109	Karaoğlanhöyük	S	100-500			2	2	2	2	0	0	0	1	2	7	low
42	Gavurtepe Höyük	S	unk	1	1			1	1	1	0	0	1	3	7	low
104	Acemhöyük	S	500-1.000			1	2	0	1	0	1	0	3	2	7	low
133	Bekaroğlu	H	unk		2			0	0	0	1	1	2	3	7	low
18	Ovabayındır	S/C	<100					0	2	0	0	1	2	2	7	low
116	Yumurtatepe	S	100-500		2			0	1	1	0	1	3	1	7	low
55	Seraglio	S	unk					1	0	0	0	2	2	1	6	low
36	Ayasuluk Tepesi	S	<100					0	1	1	0	0	1	3	6	low
56	Kos	C	unk					0	1	0	0	1	2	2	6	low
94	Kubad-abad	S	unk					0	1	0	0	0	2	3	6	low
95	Kuşluca	S/C	unk			2		0	2	0	0	0	2	2	6	low
128	Mahmatlar	H	unk			2		0	0	0	0	0	2	3	5	low
83	Bozüyük	S	unk			2	1	0	0	0	0	0	2	1	3	low
162	Soloi Pompeiopolis	H	unk				2	0	0	0	2	0	1	1	4	low
105	Sarıyer	C	unk					0	2	1	0	0	2	1	6	very low
52	Belentepe	C	unk					0	1	1	0	0	1	2	5	very low
93	Çavdarlı Höyük	C	unk					0	1	1	0	0	1	2	5	very low
35	Kabacakiri	C	<100					0	1	1	0	0	1	2	5	very low
120	Kınık	S	unk					0	0	0	0	0	2	3	5	very low
157	Topaklı Höyük	S	unk					1	1	0	0	0	1	1	4	very low
137	Yeni Hayat	C	<100					1	1	0	0	0	1	1	4	very low
79	Bayındırköy	C	unk			2		0	0	0	1	0	1	2	4	very low
147	Büyüknefes	S	unk					0	0	0	0	1	1	2	4	very low
124	Dündartepe	S/C	unk					0	2	0	0	0	1	1	4	very low
168	Domuztepe	S	unk					1	0	0	0	0	1	1	3	very low

Figure 1.21 (continued) Synoptic table providing an overview of site quality assessment of excavated Early Bronze Age sites under analysis. Cf. caption of figure 1.21 for details.

Site_no	SiteName	Site type	Exc. area (m2)	Invest. phases (cent. BC)				Publication assessment								Site impact
				33-29	29-26	26-22	22-19	A	B	C	D	E	F	G	Total	
166	Sirkeli Höyük	S	unk					1	0	0	0	0	1	1	3	very low
126	Kaledoruğu/Kavak	S	unk					0	0	0	0	1	1	1	3	very low
169	Kinet Höyük	S	100-500					0	0	0	0	0	1	2	3	very low
96	Konya-Karahöyük	S	500-1.000			1	1	0	0	0	0	0	1	2	3	very low
125	Tekeköy	C	unk					0	1	0	0	0	1	1	3	very low
85	Aharköy	S	unk					0	1	0	0	0	0	1	2	very low
17	Çandarlı	S	unk					0	1	0	0	0	0	1	2	very low
49	Damlıboğaz	C	unk					0	1	0	0	0	0	1	2	very low
34	Dedecik-Heybelitepe	C	unk					0	1	0	0	0	0	1	2	very low
77	Gavurkuyusu	C	unk					0	1	0	0	0	0	1	2	very low
53	Gümüşlük-Kadıkalesi	C	unk					0	1	0	0	0	0	1	2	very low
46	Hacı Mustafa'nın Dami	C	unk					0	1	0	0	0	0	1	2	very low
45	Miletus	S	100-500					0	0	0	0	0	1	1	2	very low
167	Tatarlı Höyük	S	unk					0	0	0	0	0	1	1	2	very low
150	Uşaklı Höyük	S	unk					0	0	0	0	0	1	1	2	very low
113	Sincan Höyük	S	100-500					1	0	0	0	0	0	0	1	very low
54	Assarlık	C	unk					0	0	0	0	0	0	1	1	very low
43	Bereketli	C	unk					0	0	0	0	0	0	1	1	very low
16	Bergama	S	unk					0	0	0	0	0	0	1	1	very low
115	Bitik Höyük	S	unk					0	0	0	0	0	0	1	1	very low
135	Boyalı Höyük	S	unk					0	0	0	0	0	0	1	1	very low
23	Bozköy Höyücek	S	unk					0	0	0	0	0	0	1	1	very low
25	Buruncuk/Larisa	S	unk					0	0	0	0	0	0	1	1	very low
22	Ege Gübre	S	unk					0	0	0	0	0	0	1	1	very low
160	Fıraktın	S	unk					0	0	0	0	0	0	1	1	very low
130	Göller	C	unk					0	0	0	0	0	0	1	1	very low
66	Hacımusalar	S	unk					0	0	0	0	0	0	1	1	very low
153	Hashöyük	S	unk					0	0	0	0	0	0	1	1	very low
24	Helvacı Höyücek	S	unk					0	0	0	0	0	0	1	1	very low
57	Kap Krio	C	unk					0	0	0	0	0	0	1	1	very low
108	Karayavşan	S	unk					0	0	0	0	0	0	1	1	very low
146	Kayapınar	S	unk					0	0	0	0	0	0	1	1	very low
164	Kazanlı	S	unk					0	0	0	0	0	0	1	1	very low
101	Kemerhisar	S	unk					0	0	0	0	0	0	1	1	very low
121	Kocagöz/Demircihöyük	S	unk					0	0	0	0	0	0	1	1	very low
97	Konya-Alaeddintepe	S	unk					0	0	0	0	0	0	1	1	very low
59	Köyceğiz	C	unk					0	0	0	0	0	0	1	1	very low
131	Kuşsaray	S	unk					0	0	0	0	0	0	1	1	very low
2	Menekşe Çatağı	S	unk					0	0	0	0	0	0	1	1	very low
14	Methymna	S	unk					0	0	0	0	0	0	1	1	very low
129	Oymaagaç	S	unk					0	0	0	0	0	0	1	1	very low
26	Panaztepe	S	unk					0	0	0	0	0	0	1	1	very low
139	Pazarlı	S	unk					0	0	0	0	0	0	1	1	very low
99	Pınarbaşı	S	unk					0	0	0	0	0	0	1	1	very low
100	Porsuk/Zeive Tepe	S	unk					0	0	0	0	0	0	1	1	very low
40	Sardis	S	unk					0	0	0	0	0	0	1	1	very low
87	Şarhöyük	S	unk					0	0	0	0	0	0	1	1	very low
78	Selçikler	S	unk					0	0	0	0	0	0	1	1	very low
73	Senirce	S	unk					0	0	0	0	0	0	1	1	very low
98	Sızma Höyük	S	unk					0	0	0	0	0	0	1	1	very low
158	Sultanhan	S	unk					0	0	0	0	0	0	1	1	very low
3	Toptepe	S	unk					0	0	0	0	0	0	1	1	very low
41	Toygar	C	unk					0	0	0	0	0	0	1	1	very low
51	Turgut/Lagina	C	unk					0	0	0	0	0	0	1	1	very low
65	Yarımhöyük	S	unk					0	0	0	0	0	0	1	1	very low
64	Yassıhöyük 2 (Burdur)	S	unk					0	0	0	0	0	0	1	1	very low
136	Yörüklü/Huseyindede	C	unk					0	0	0	0	0	0	1	1	very low
156	Zank Höyük	S	unk					0	0	0	0	0	0	1	1	very low
63	Akhan	C	unk					0	0	0	0	0	0	1	1	very low
114	Asarcıhöyük/Ilıca	S	unk					0	0	0	0	0	0	1	1	very low

Figure 1.21 (continued) Synoptic table providing an overview of site quality assessment of excavated Early Bronze Age sites under analysis. Cf. caption of figure 1.21 for details.

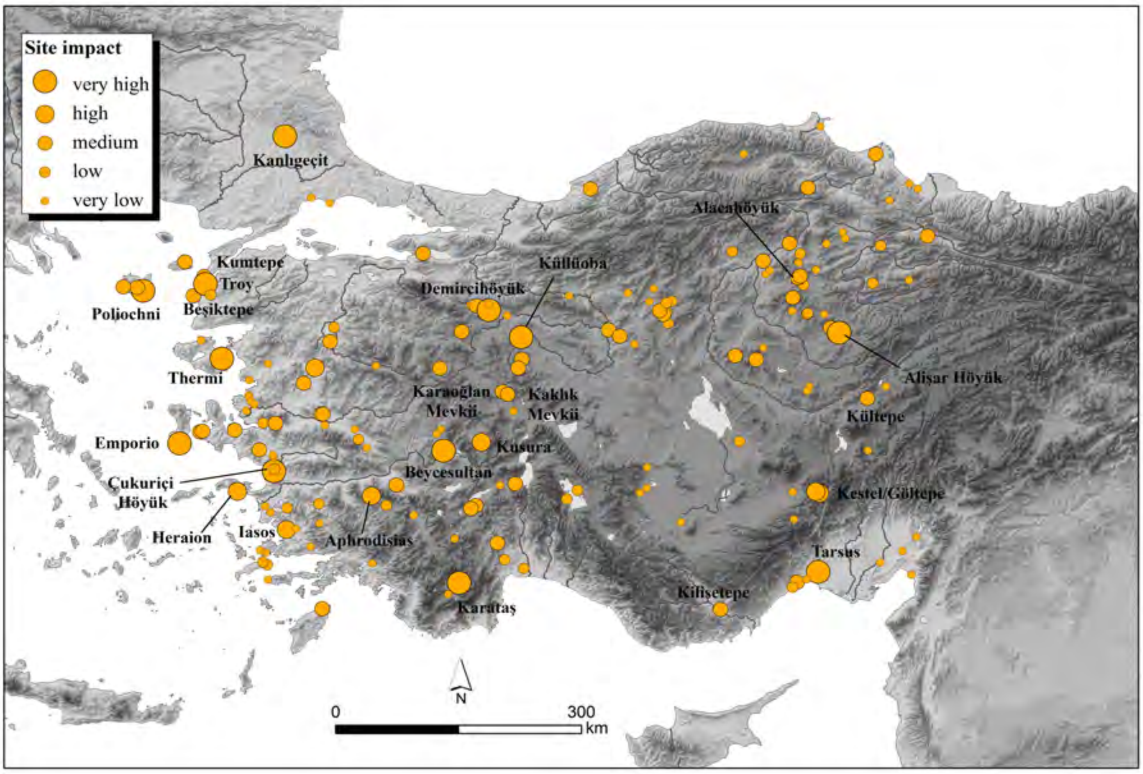


Figure 1.22 Intensity of archaeological investigation on the west and central Anatolian EBA: different symbol sizes represent varying degrees of site-impact at individual excavated sites (data from figure 1.21). Note the almost total absence of well-published and extensively excavated projects in mountainous regions, the Konya plain and the southern Anatolian coast.

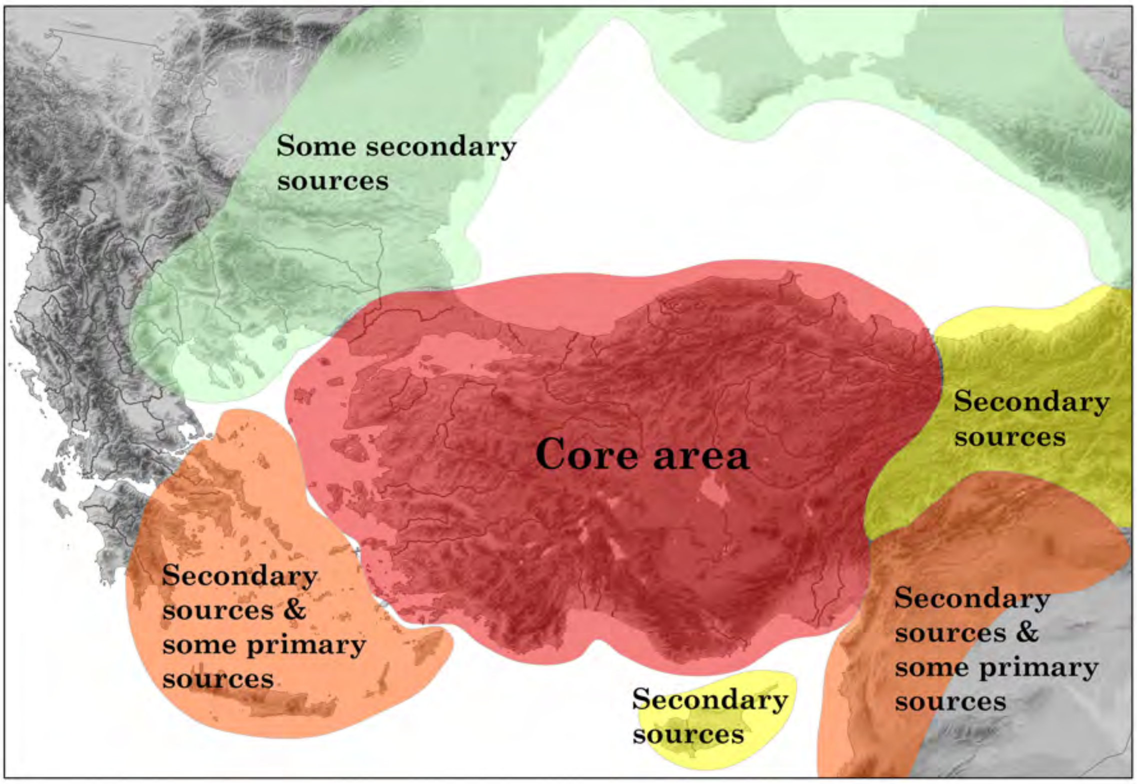


Figure 1.23 Intensity of personal research on EBA archaeology of west-central Anatolia and surrounding regions.

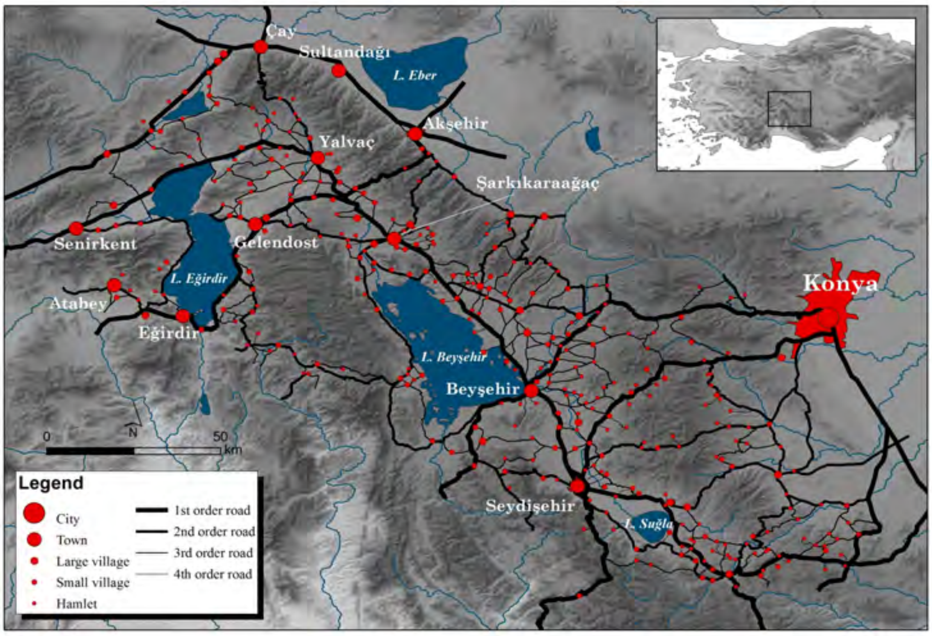


Figure 2.1 Map of modern settlements and road network in the Lake District (south-western Turkey, see inset), digitised from Google Earth. The assessment of settlement size is based on the aggregated built area calculated on ArcGIS 10; "Towns" are also formal district capitals ("Ilçe merkezi" in Turkish), "City" is the provincial capital ("Il merkezi"). The assessment of road importance was checked against modern road maps provided online by the Turkish Ministry of Transport (http://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Bolgeler/Bolgeler.aspx). 1st order: state roads ("Devlet yolları"), 2nd order: provincial roads ("Il yolları"), 3rd order: roads connecting more than one village and/or more than one road, 4th order: road connecting a single village to the nearest larger road. Note that there are no ferry services active on the major lakes, thus movement is essentially constrained along the roads.

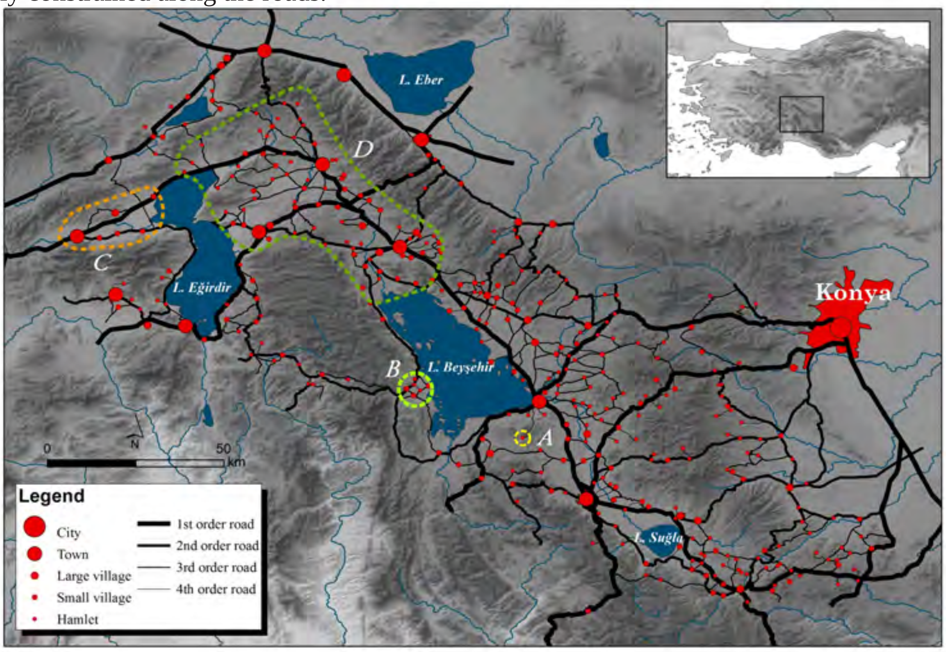


Figure 2.2 Map of modern settlements and road network in the Lake District (see figure 2.1 for details), showing how landscape barriers (orography and hydrology) and physical distance may promote the formation of relatively isolated communities ("small-worlds") at different spatial scales: a) Şamlar village, surrounded on all sides by high mountains (between 100-300m higher than valley floor), and whose only connection with the outside world is a dirt-road to Beyşehir; b) a small group of villages, on the valley floor but surrounded by mountains on three sides and limited by the Beyşehir lake on the other, physically isolated from neighbouring communities (between 15-20km away); c) a group of villages in the narrow Senirkent valley, surrounded by mountains and the Eğirdir Lake; d) a large group of communities in the Yalvaç valley, again constrained by the Eğirdir Lake and mountains.

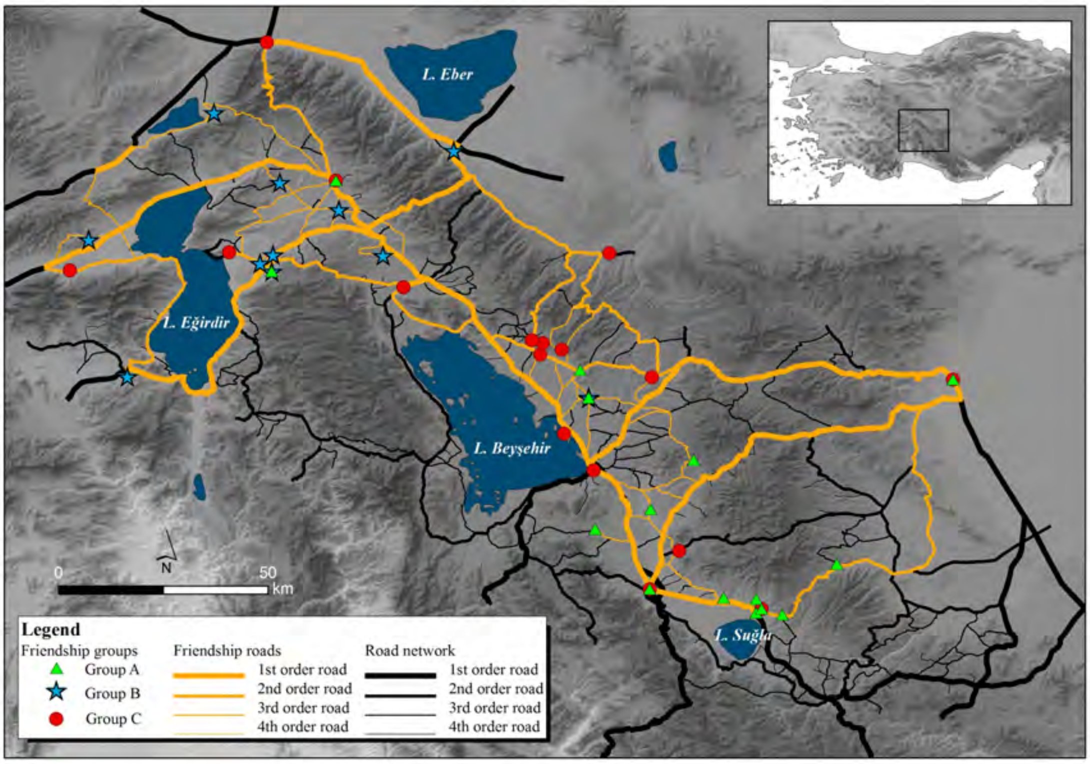


Figure 2.3 Map showing *fictional* social networks based on friendship relations in the Lake District (see figure 2.1 for details). Symbols represent affiliation to a specific friendship cluster, "friendship roads" are t he paths employed to visit friends at each other's homes. While main roads are extensively employed to traverse longer distances, local roadways are also used in significant proportions. Different friendship groups are to some extent spatially defined, with a few individuals participating in two or more friend clusters and thus acting as bridges ("gateways") between them.

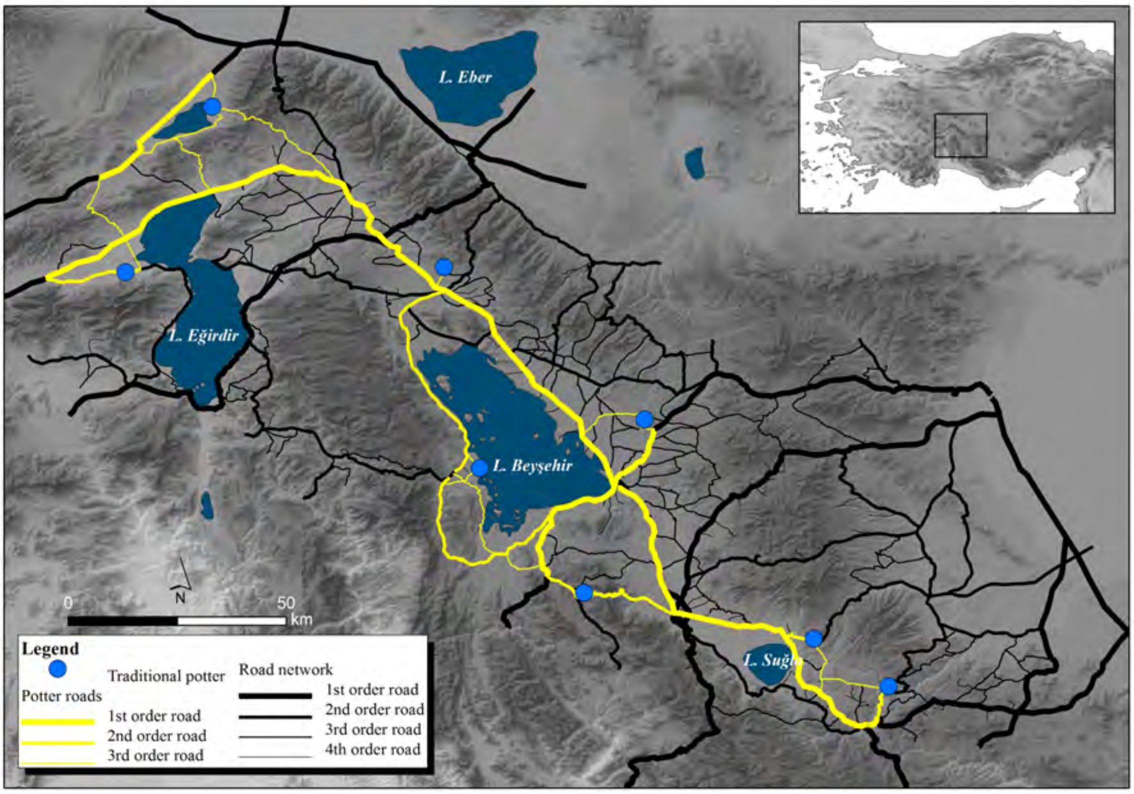


Figure 2.4 Map showing a *fictional* social network based on sharing of technological know/how in the Lake District (see figure 2.1 for details), in which traditional potters meet at each other's workshops. While main roads are extensively employed to traverse longer distances, local roadways are also used in significant proportions.

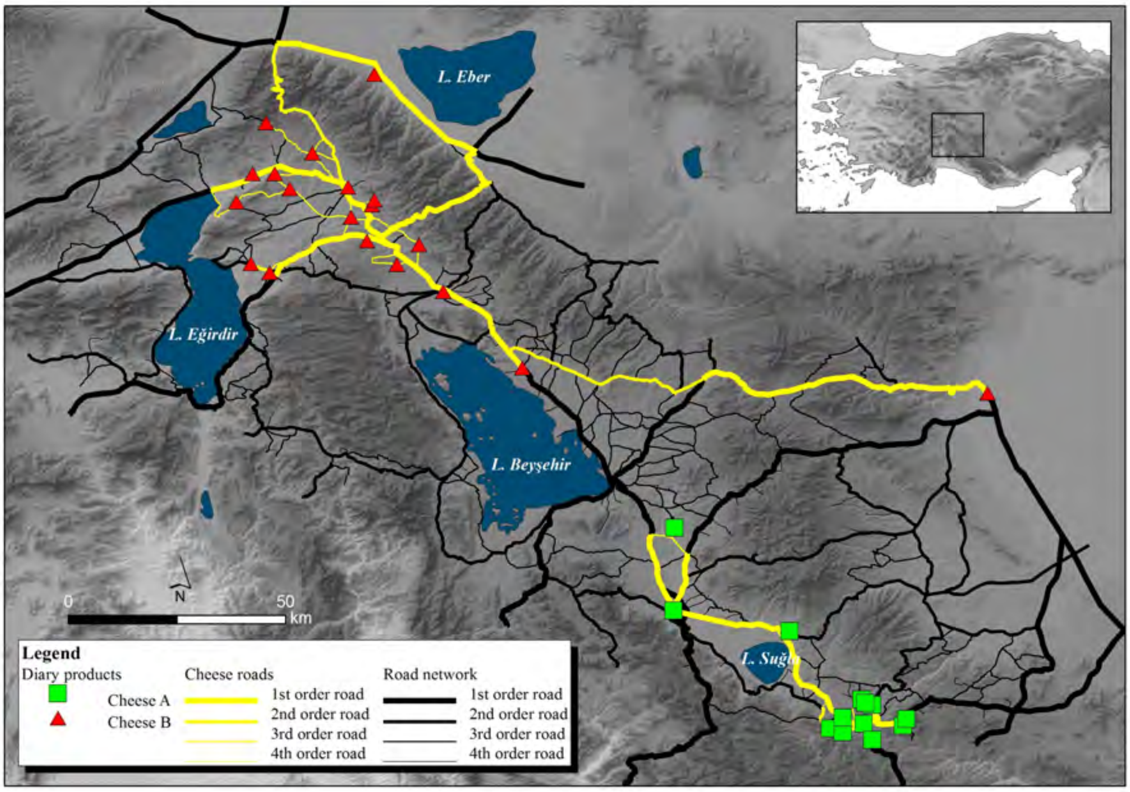


Figure 2.5 Map showing a *fictional* social network based on the distribution of dairy products sold at the local markets of Bozkır (cheese A) and Yalvaç (cheese B) in the Lake Region (see figure 2.1 for details). The spatial distribution is quite localised and makes extensive use of local roads as well as main ones.

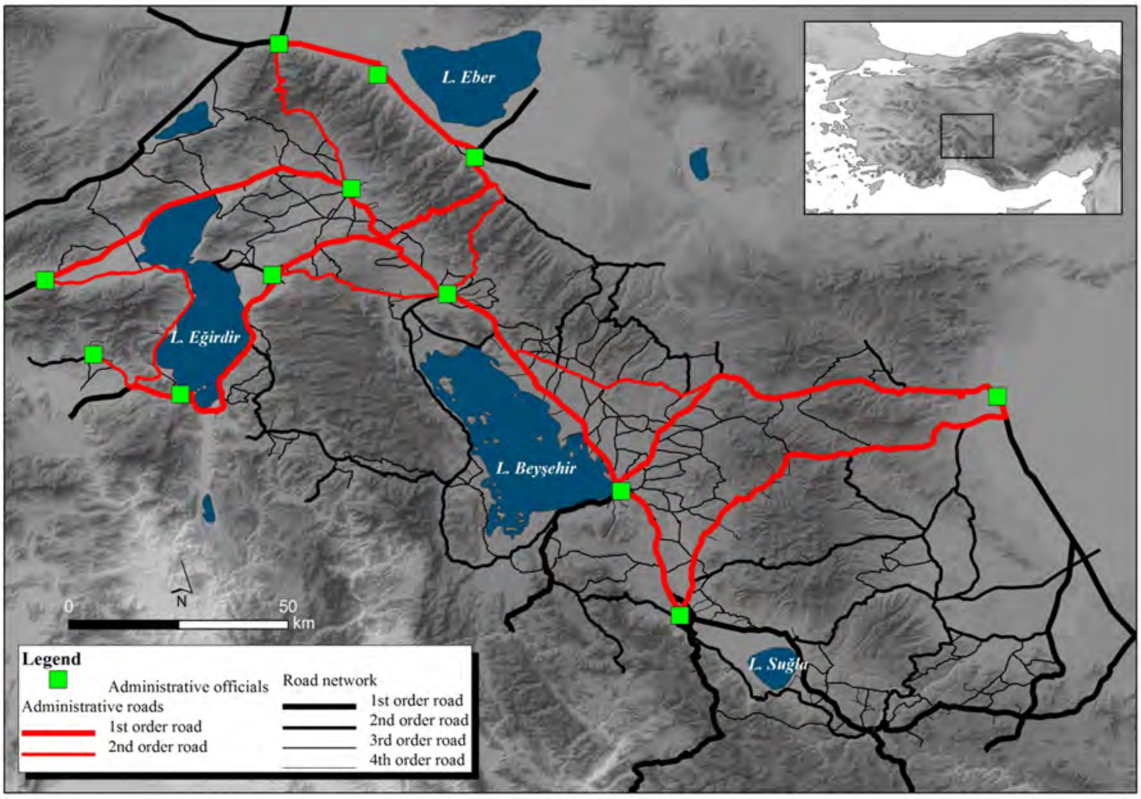


Figure 2.6 Map showing a *fictional* social network composed by governmental officials working in the district and provincial capitals of the Lake District (see figure 2.1 for details). Administrative officials are based in major centres, and when they have face-to-face encounters they tend to meet in the institutional buildings, and tend to employ mostly main (1st and 2nd order) roads.

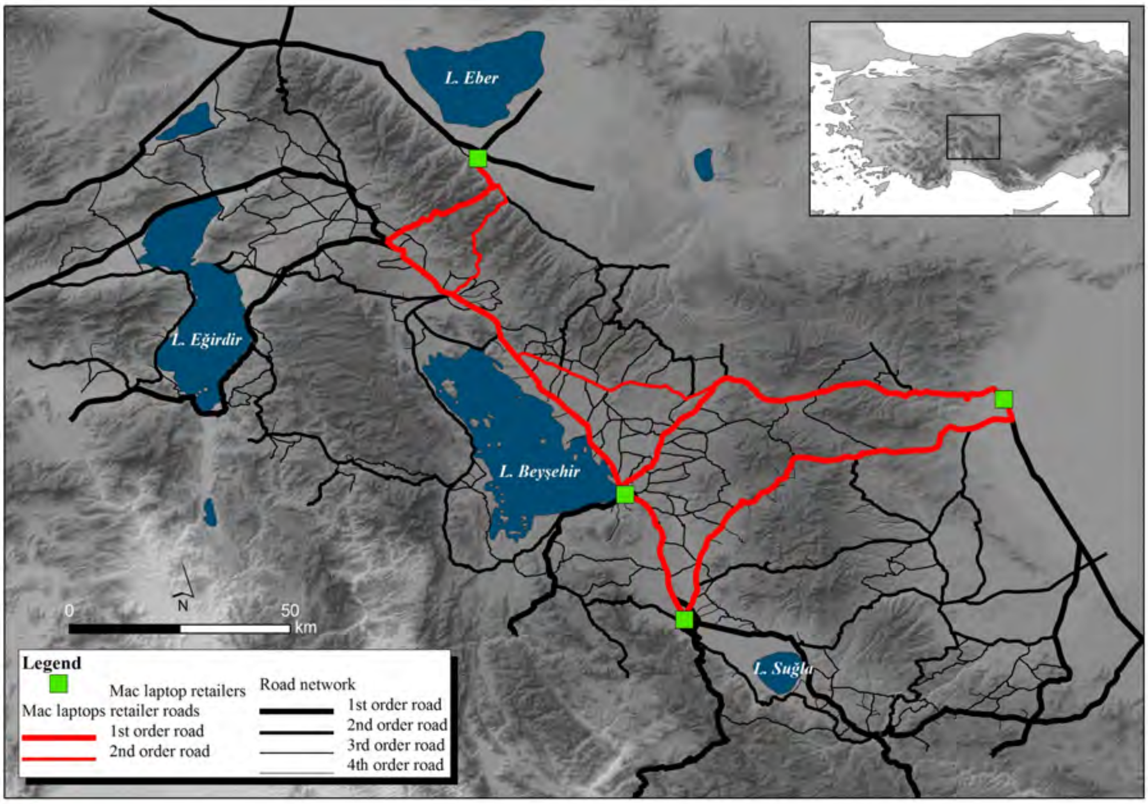


Figure 2.7 Map showing a *fictional* social network based on the distribution of Apple computer laptops (as an example of "prestige goods") in the Lake District (see figure 2.1 for details). The spatial distribution is limited to main centres where retailers are located, and the network is essentially functioning along main roads only.

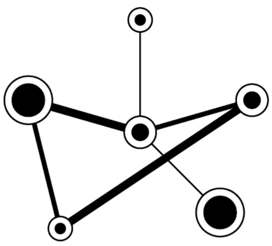


Figure 2.8 Schematic representation of a network with nodes and edges experiencing varying degrees of interaction, represented by different symbol sizes (from Newman 2003:fig.3c).

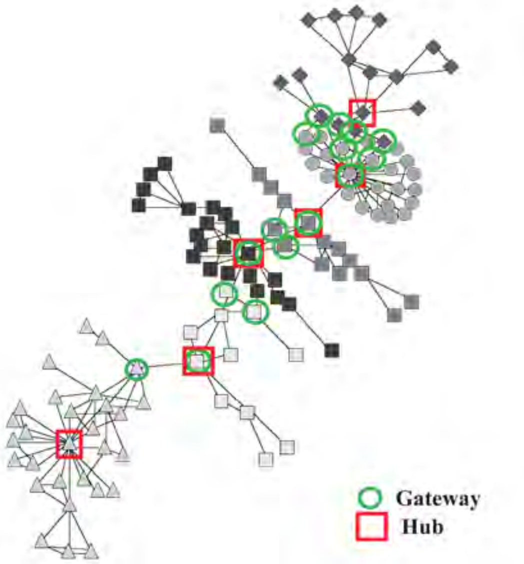


Figure 2.9 Representation of an academic social network, in which the nodes represent researchers from different disciplines (coded with different colours and symbols), while the connections are represented by paper co-authorship (modified after Knappett 2011:fig.3.4). In this example, most researchers collaborate with other academics from their own field of study, creating quite well-definable "clusters" within the wider network. Only a few write papers with scholars from other disciplines: these represent the bridges (or "gateways") between fields. Also, while most researchers collaborate only with one or two peers, a few co-write papers with a significantly higher number of people and act as connectors (or "hubs") within their discipline. Some academics are both "gateways" and "hubs", since they collaborate with researchers from other fields and with a high number of colleagues from their own discipline.

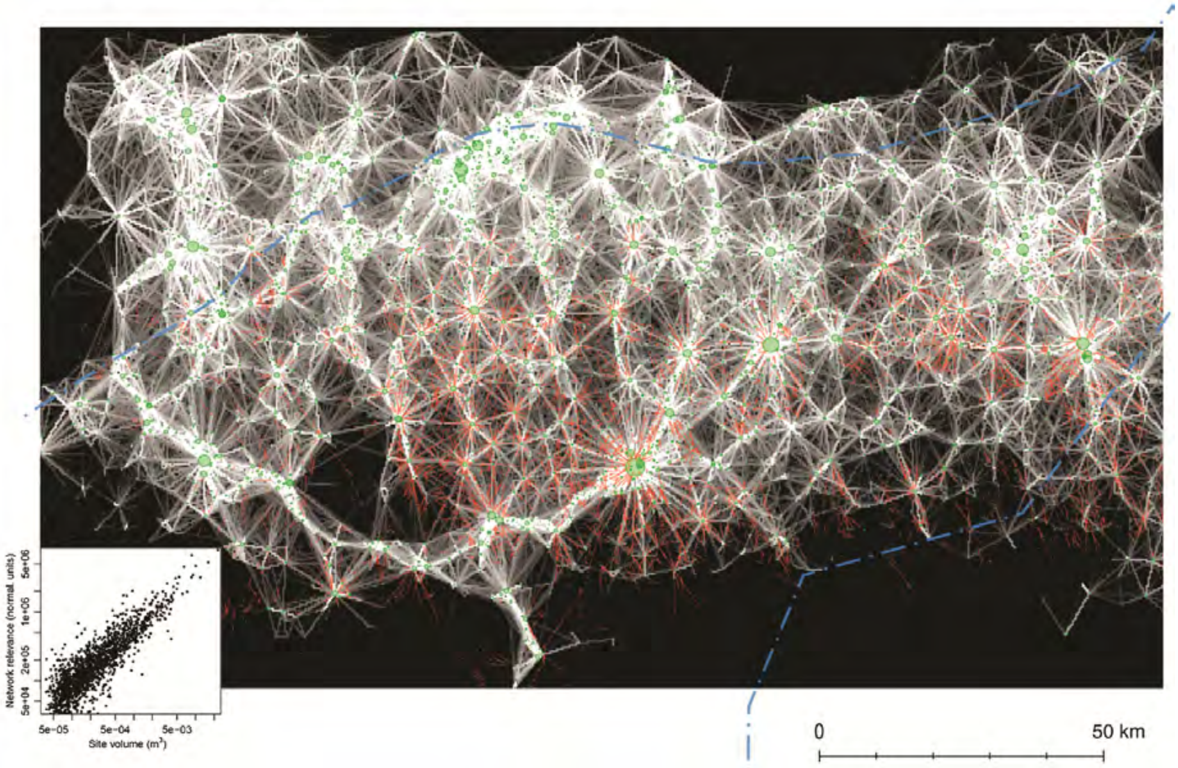


Figure 2.10 Map showing a subset of the archaeological sites (in green) and roads ("hollow ways", in red) identified by a decade of satellite imagery analysis in the Khabur plain, Syria (Menze and Ur 2012:fig.8). White lines represent suggested topographic "corridors" between sites: note the overlapping with actual road remains in most cases, and the quite regular lattice created by the absence of significant landscape barriers. Inset shows the tight positive correlation between degree centrality (defined in their work as "network relevance") and site size (expressed in volume), with larger sites also being more central in the network.

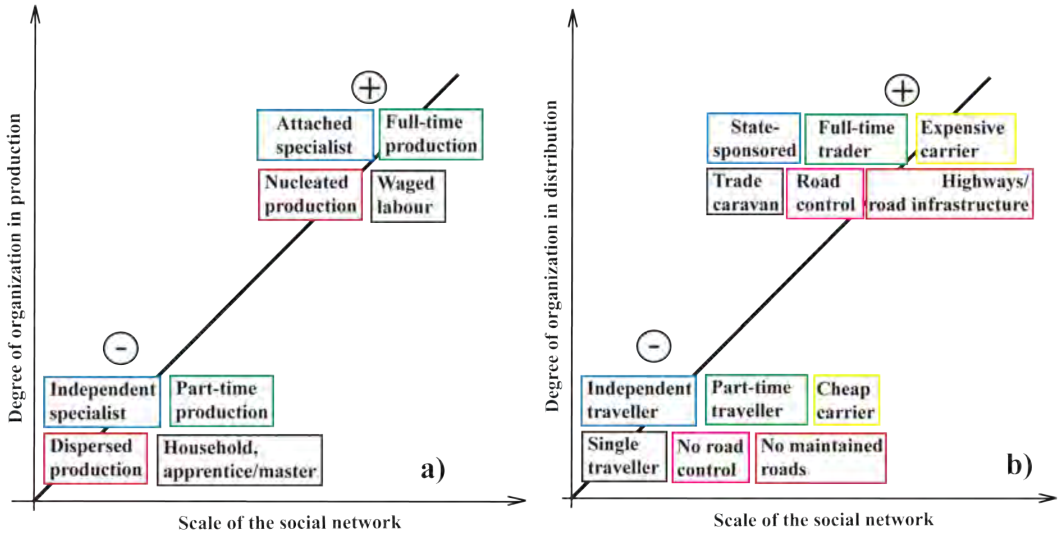


Figure 2.11 Schematic representation of organizational complexity in production activities (a) and distribution activities (b). In both cases it is suggested a positive correlation between the degree of complexity and the maximum spatial extent of the social network within which these activities are embedded (cf. section 2.2.2 for details).

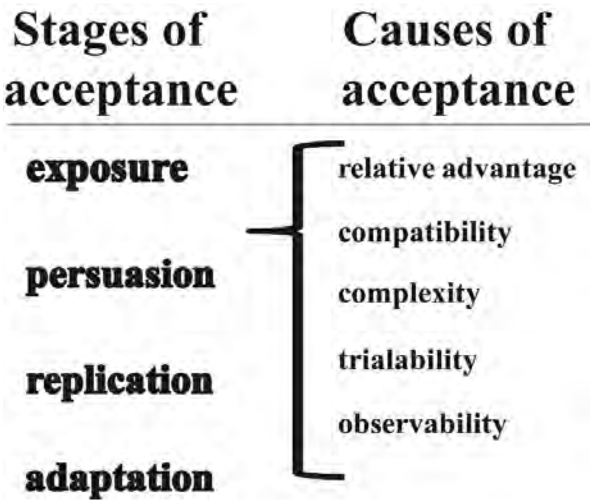


Figure 2.12 Schematic representation of the individual steps that compose the process of acceptance of a given innovation in a community or society, and the possible causes of adoption or rejection of the innovation (based on Rogers 2003, cf. section 2.4.4 for details).

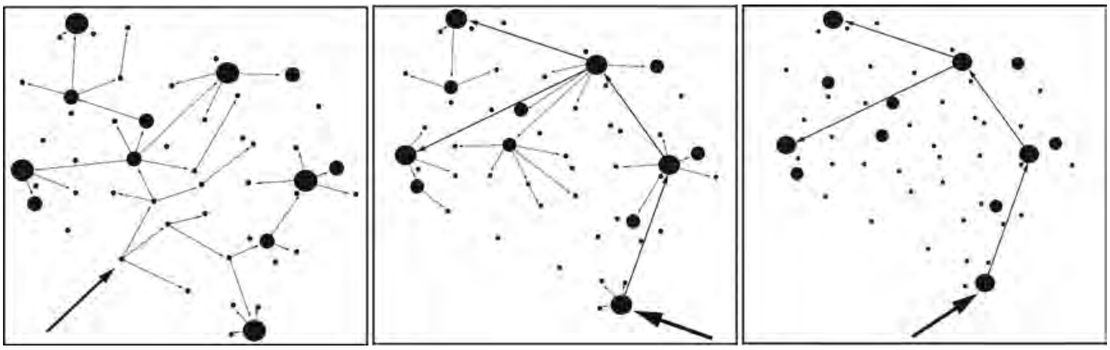


Figure 2.13 Models of diffusion of innovation (the starting point is represented by a thicker arrow) within an idealised social settlement network (larger dots indicate larger populations): a) wave interaction, b) dendritic interaction, c) inter-centre interaction.

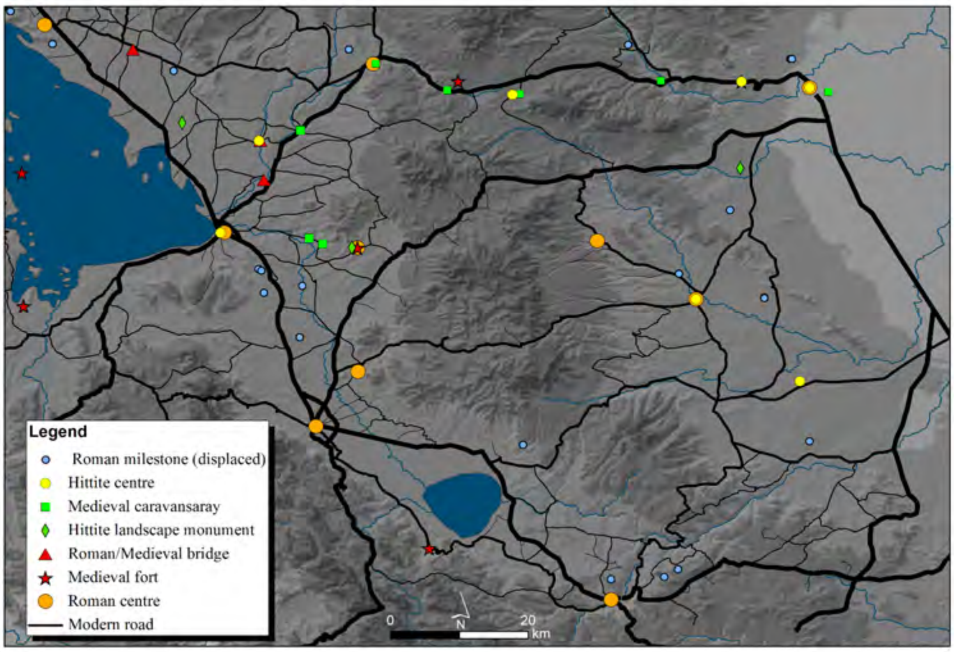


Figure 2.14 Map showing the modern road network of the Lake District (cf. figure 2.1 for details) and its association to archaeological features from different periods (from Hittite to Medieval) that are related with roads and road infrastructure (data collected for the ongoing Fasıllar Survey Project, courtesy of Dr. Yiğit Erbil). Note that Roman milestones are in all cases not in their original context but found embedded in more recent architectural monuments (e.g. walls of houses, mosques and bridges), and thus often a few kilometres away from their original location.

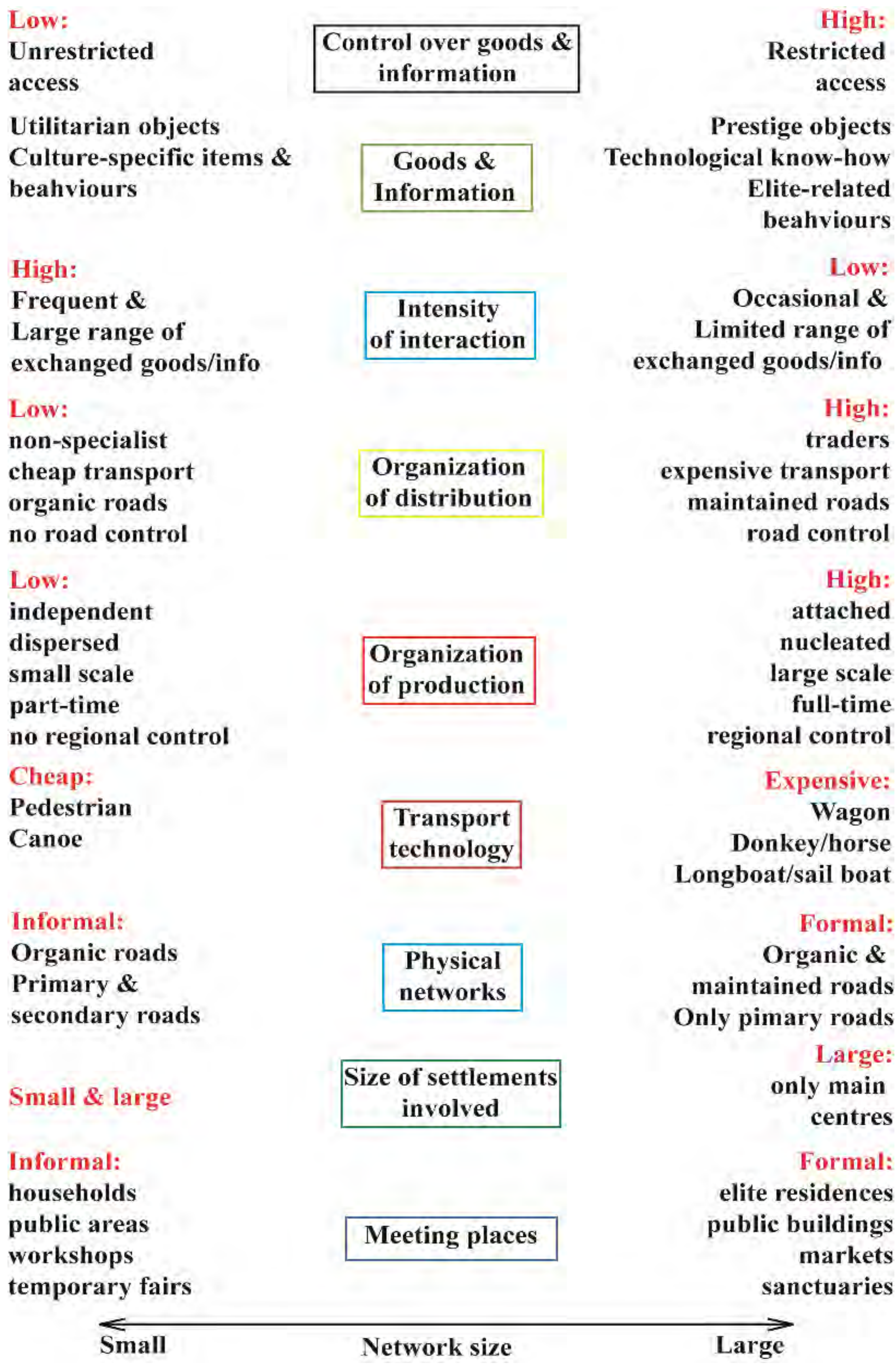


Figure 2.15 Suggested association between the maximum spatial extent of a given social network and the degree of complexity behind production, distribution and social control (cf. section 2.4.5 for details).

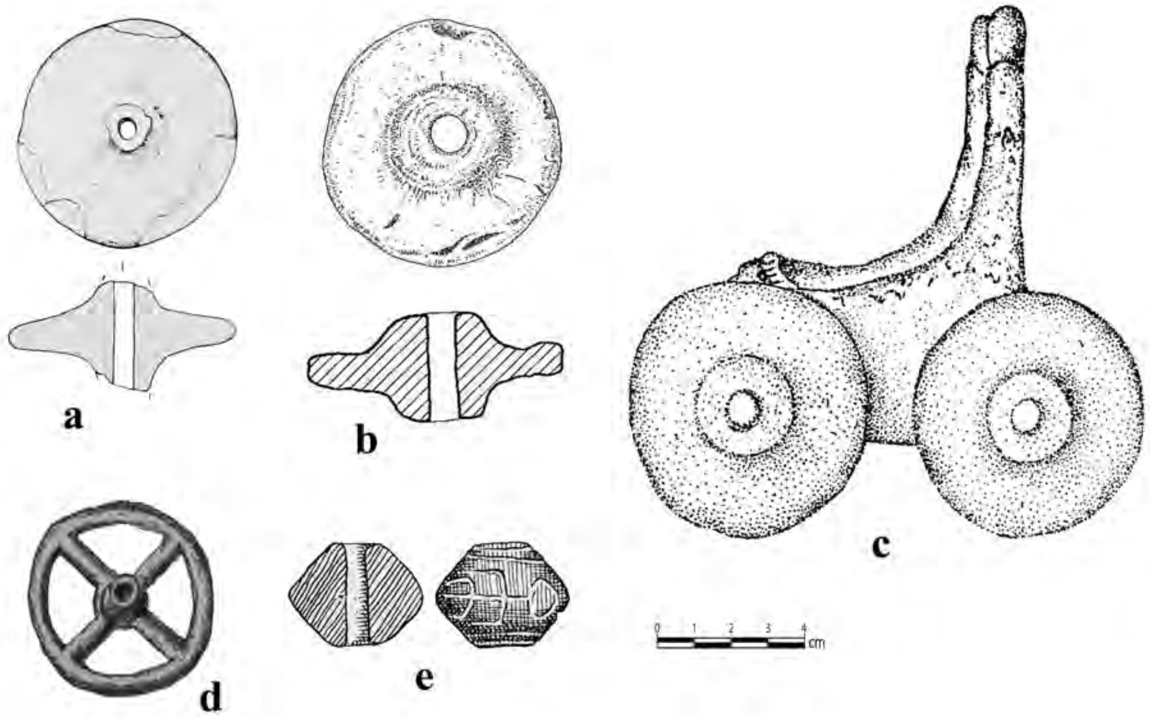


Figure 3.1 Wheel and wagon models in EBA Anatolia, at the same scale: a) Kanlıgeçit clay solid disk wheel (Özdoğan and Parzinger 2012:fig.193), b) İkiztepe clay solid disk wheel (Alkım et al.1988:pl.75-13), c) Adana clay wagon model (Özgen 1986:fig. 3), c) Troy IV lead spoked wheel (Schliemann 1881:fig.1253). A clay spindle whorl from Kusura (Lamb 1938:fig.20-2) is also put for comparison (e), to show the difference between clay wheel models and spindle whorls.

Figure 3.2 External fortifications at Liman Tepe. In the foreground the Archaic gate and bastions are visible, in the top left corners there are remains of the EBA horse-shoe shaped bastion, while in the centre right of the photo wheel ruts cut by a Protogeometric grave are visible (from Ersoy et al.2011:fig.5). The Proto-geometric grave (c.11th century BC) gives a terminus post quem for the ruts and indicates that they pre-date the Archaic layers. Further, in the area of the EBA outer fortifications there are no 2nd millennium materials, and there is no evidence that MBA and LBA settlements extended beyond the citadel some 300m away, nor that the outer fortifications were still in use during this period (Yaşar Ersoy pers.comm. May 2013). In all probability, the ruts thus belong to the late EBA phase of the gate and represent the earliest direct evidence of wheeled carts in west and central Anatolia.

Site name	Chronology	Publ. quality	Assemblage size	Equid remains	Comment	Reference
Çadir Höyük	4500-2800 BC	high	1300	3.6% ("LCh"), 6.8% ("EB I")	Equid bones appear since mid-5th millennium BC, analyst unsure whether domesticated or wild horse	Arbuckle 2009; Steadman et al.2013
Kumtepe	c.3200-2900 BC	medium	unknown	absent		Uerpmann M. 2006
Çukuriçi Höyük	2900-2750 cal BC	medium	unknown	absent		Horejs et al.2010
Küllüoba	c.3200-2200 BC	high	8600	1.8% ("LCh"), 1.2% ("EB I"), 0.14% ("EB II/III")	Wild horse only	Gündem 2012
Demircihöyük	c.2850-2600 cal BC	high	121000	1.6% ("EB I-II")	Wild horse only	Rauh 1981; Driesch and Boessneck 1987
Troy	c.2850-2200 cal BC	high	90000	absent	Horse only in MBA layers	Uerpmann H.P. 2003; Uerpmann M. 2006
Karataş	c.2700-2400 BC	medium	1600	2.2% ("EB I"), 0.5% ("EB II")	Unknown species, possible contamination with Irona Age levels	Hesse and Perkins 1974
Kanligeçit	c.2600-2100 BC	high	15200	2% (KG 4), 7.5% (KG3), 0.8% (KG2)	Domesticated horse since 2600 cal BC	Benecke 2012
Acemhöyük	c.2500-2000 BC	medium	800	5% (level V), 13% (level IV), 2 bones (level XI)	Domesticated donkey since level XI (c.2600-2500 BC)? horse since level V (c.2000 BC)	Öztan and Arbuckle 2013; Arbuckle 2013
Kaman Kalehöyük	c.2100-1950 BC	medium	4700	0.01% (level IV)	Domesticated donkey	Atıcı 2003, 2005
Aphrodisias	LCh+EBA	medium	4100	0.04% (LCh), 0.37% (EBA)	Unknown species	Crabtree and Mongel 1986
Alisar Höyük	EBA	low	unknown	absent	Horse only in Hittite layers	Patterson 1937
Alacahöyük	EBA	very low	unknown	1 bone	Described as "asinus" (donkey)	Koşay 1951:101-103

Figure 3.3 Summary table of zooarchaeological studies targeting EBA western and central Anatolian sites, in chronological order (for their location, see figure 3.4). They have been assessed in terms of publication quality (amount of detail provided), the analysed bone assemblage size, whether equid bones were identified, and whether they could be attributed to a species.

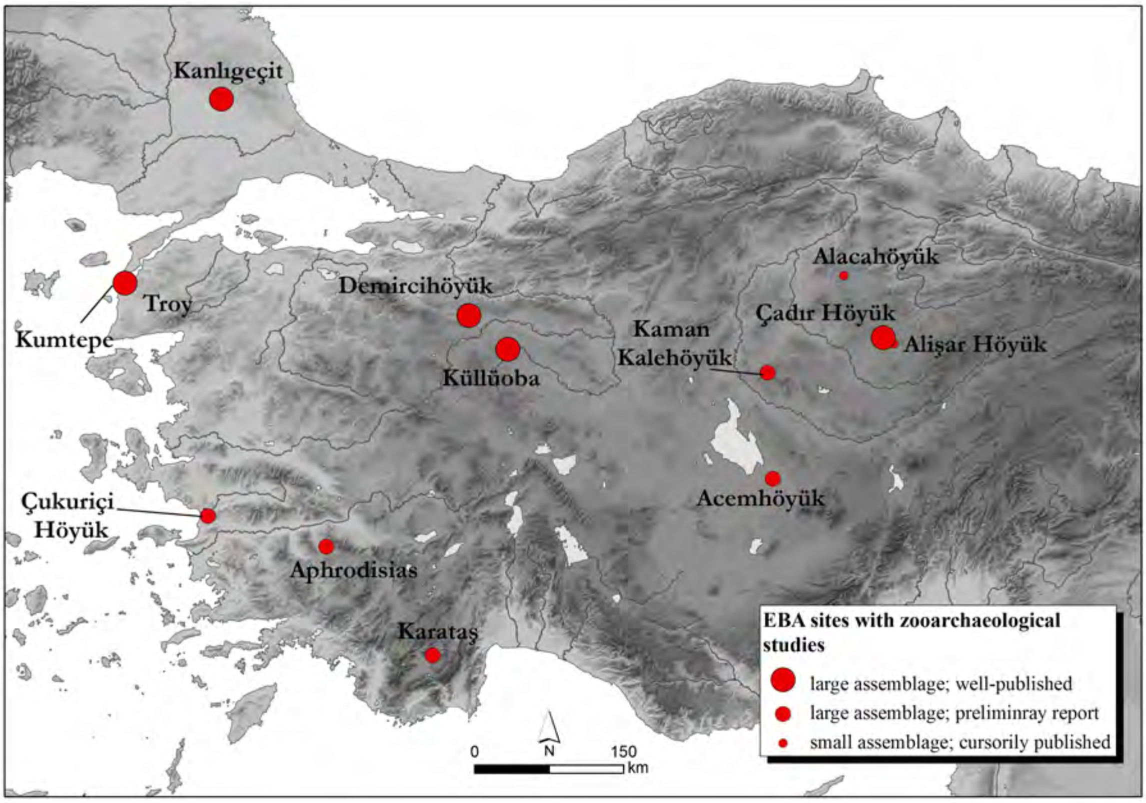


Figure 3.4 Map showing the location of EBA zooarchaeological studies in EBA western and central Anatolia. Larger dots represent higher quality studies.

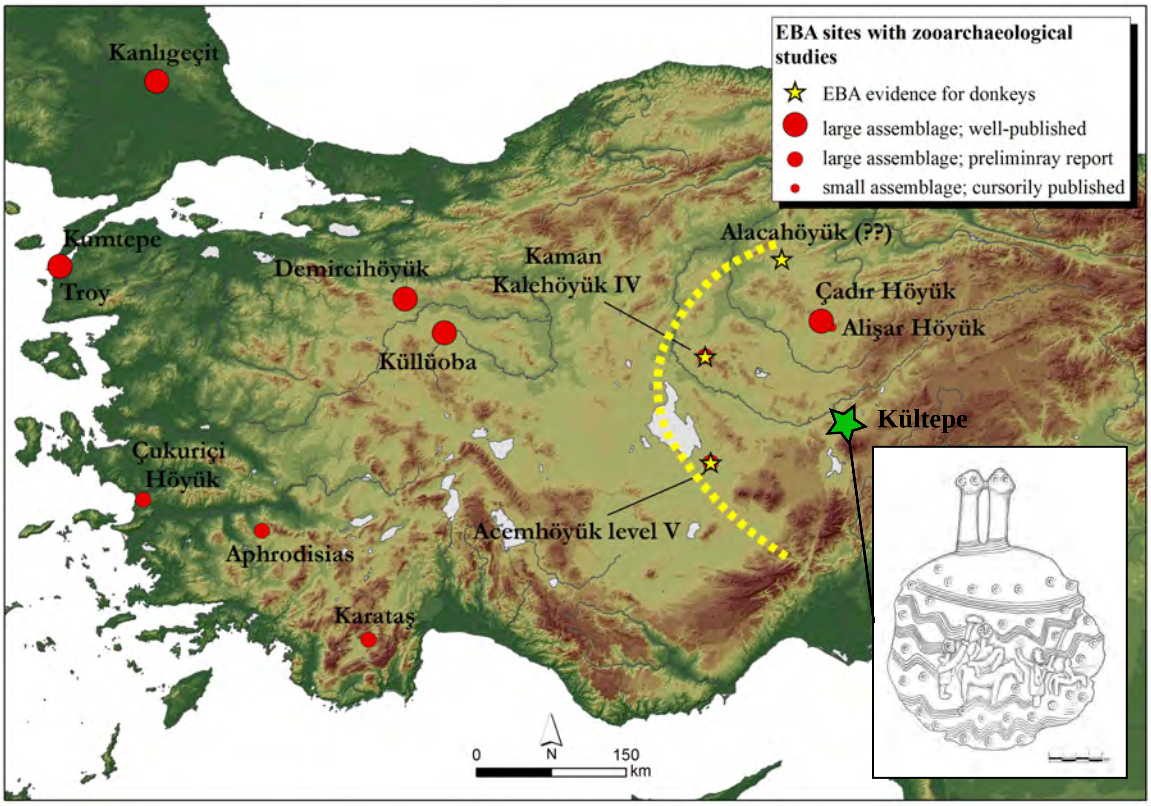


Figure 3.5 Map showing the sites with clear evidence for the presence of domesticated donkey: Acemhöyük level V, Kaman Kalehöyük level IV and possibly also Alacahöyük (see text for details). The engraved “alabaster idols” depicting two equids (donkeys?) is an unstratified find from Kültepe (Bilgi 2012:fig.834), however stylistically dateable to levels 12-11 (c.2200-2000 BC).

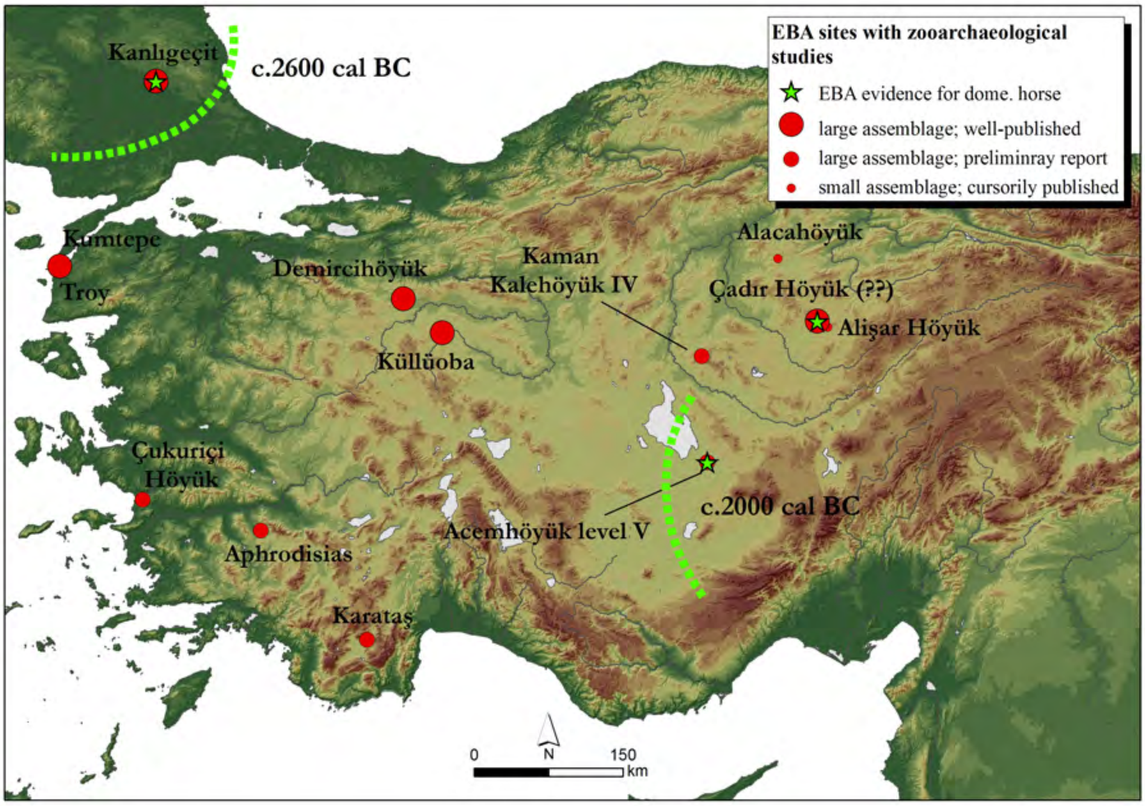


Figure 3.6 Map showing the sites with clear evidence for the presence of domesticated horse: Kanlıgeçit KG 4 andAcemhöyük level V (see text for details). Çadır Höyük is also been included, even though claims for domesticated horse already in Late Chalcolithic levels have not yet been confirmed.

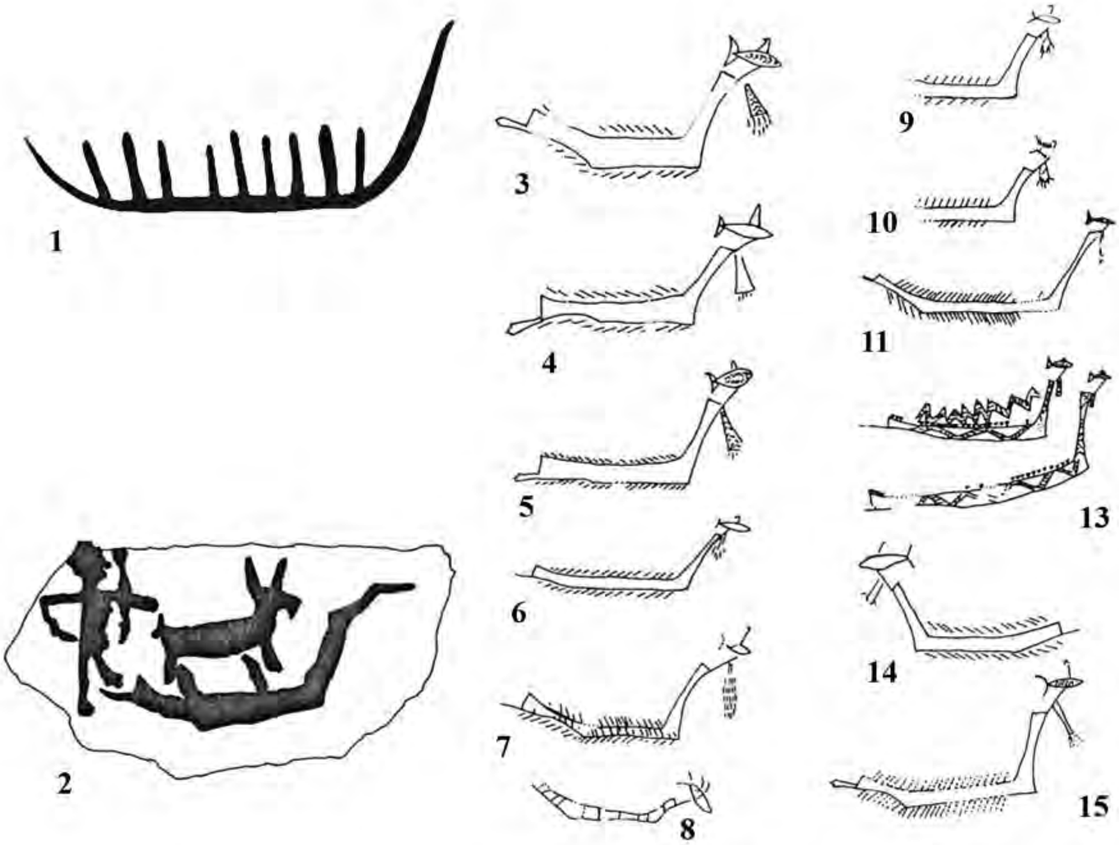


Figure 3.7 Boat depictions on late 4th millennium petroglyph from Strophilas (no.1), on 3rd millennium petroglyph from Naxos (no.2) and on EC II (c.2800-2300 BC) Cycladic "frying pans" (nos.3-14). Figures from Broodbank 2000:fig.23; Televantou 2008:fig.6.8.

Carrier	Earliest date	Km/day	Load (kg)	Evidence	Acquisition	Upkeep	Reference
Pedestrian	pre-EBA	32-40	-	Modern experimental test, Classical literary evidence	-	-	Pendlebury 1939; Summers 2013
Human porter	pre-EBA	20-24	20-30	Modern experimental test, Classical literary evidence	-	-	Bevan 2013:table 1
Small canoe	pre-EBA	20-25	50-150	Ethnographic comparison, EBA iconographic evidence and modern experimental replicas	+	+	Broodbank 2000:102
Longboat	late 4th mill.	40-50	up to 1,000	Ethnographic comparison, EBA iconographic evidence and modern experimental replicas	+++	++	Broodbank 2000:102
Ox-drawn cart	c.3,000-2,700 BC	16-32	300-1,000	Ethnographic comparison, MBA textual evidence	++	+	Bevan 2013:table 1; Barjamovic 2011:22, 51
Sail boat	c.2300-2100 BC	15-90	up to 20,000	Modern experimental replicas; Classical literary evidence, LBA archaeological evidence	+++	+++	Casson 1951; Erkurt 2005; Pulak 1998
Pack donkey	c.2200 BC	25-35	70-75	Middle Bronze Age textual evidence	+	+	Barjamovic 2011:16, 34; Stol 2004:888
Ridden horse	c.2100 BC	80-240*	10-20	Modern experimental testing, Classical literary evidence	++	++	Minetti 2003

Figure 3.8 Table showing the transport carriers available in 3rd millennium Anatolia, with provisional dates for the evidence of their earliest appearance in Anatolia, estimated cargo capabilities, daily travel distances and expenditure of acquisition and upkeep. Daily range is based on eight-hour travel. * The upper daily distance limit for horse is set by the existence of horse relays along main roads and would have been unlikely in EBA contexts.

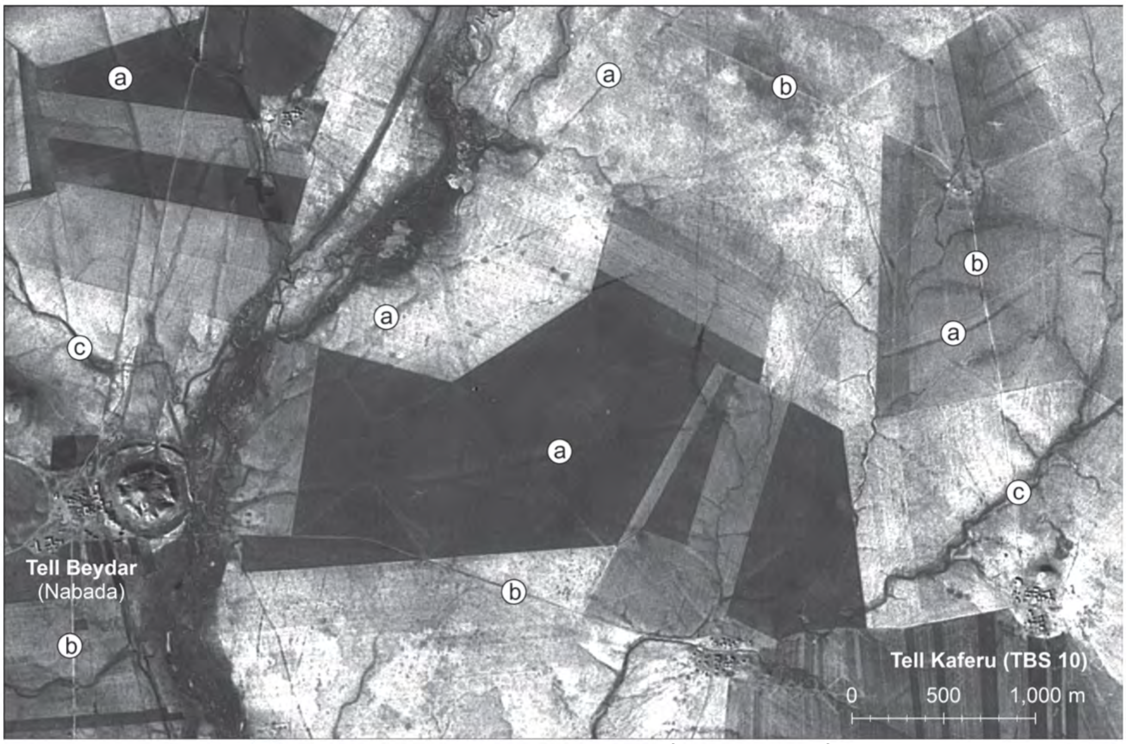


Figure 3.9 “Hollow ways” (marked with letter “a”) departing from the site of Tell Beydar in northern Syria (from Ur 2009:fig.9.5). Roads marked with (b) are modern roads, lines marked with (c) are watercourses.

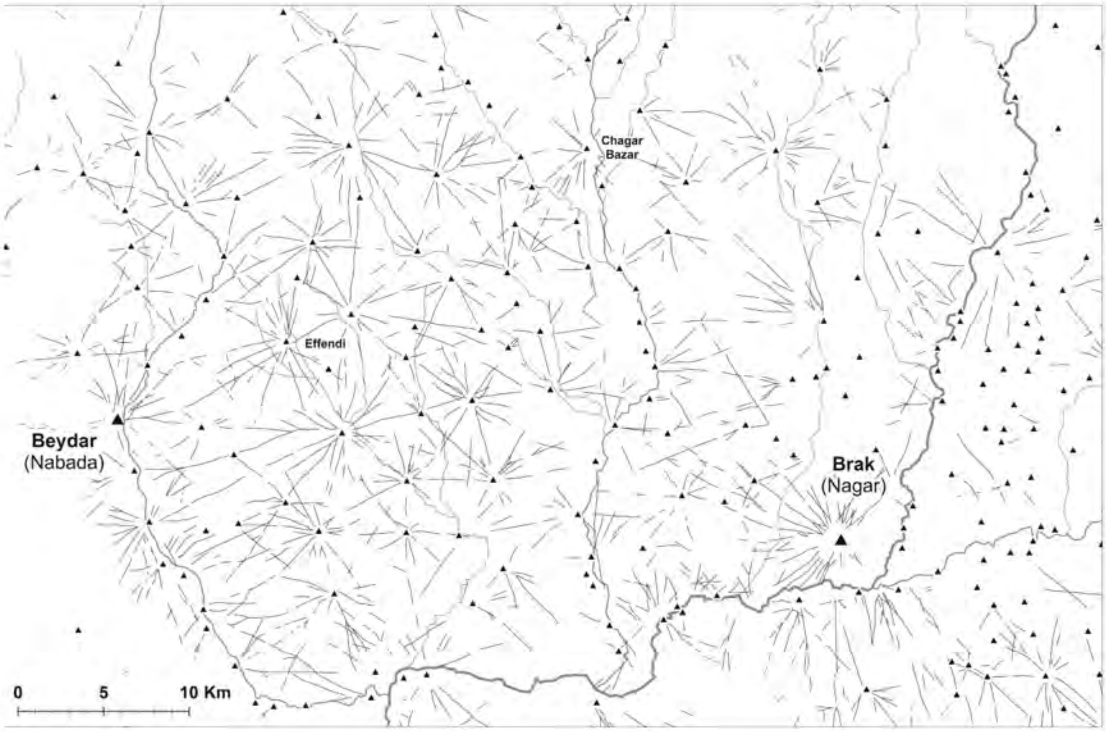


Figure 3.10 Early Bronze Age “hollow ways” in the Upper Khabur basin, Syria (from Ur 2009:fig.9.2).

Figure 3.11 Aerial photograph of Richmond Park (London, UK) taken in 1945 (source: Google Earth, centre-point: lat= 51.4424, long= -0.2777).

Figure 3.12 Satellite image of Richmond Park (London, UK) taken in 2012 (source: Google Earth, centre-point: lat= 51.4424, long= -0.2777).

Figure 3.13 Digitised park trails from 1945 (in red, from figure 3.11) and from 2012 (in black, from figure 3.12). Richmond Park (London, UK).

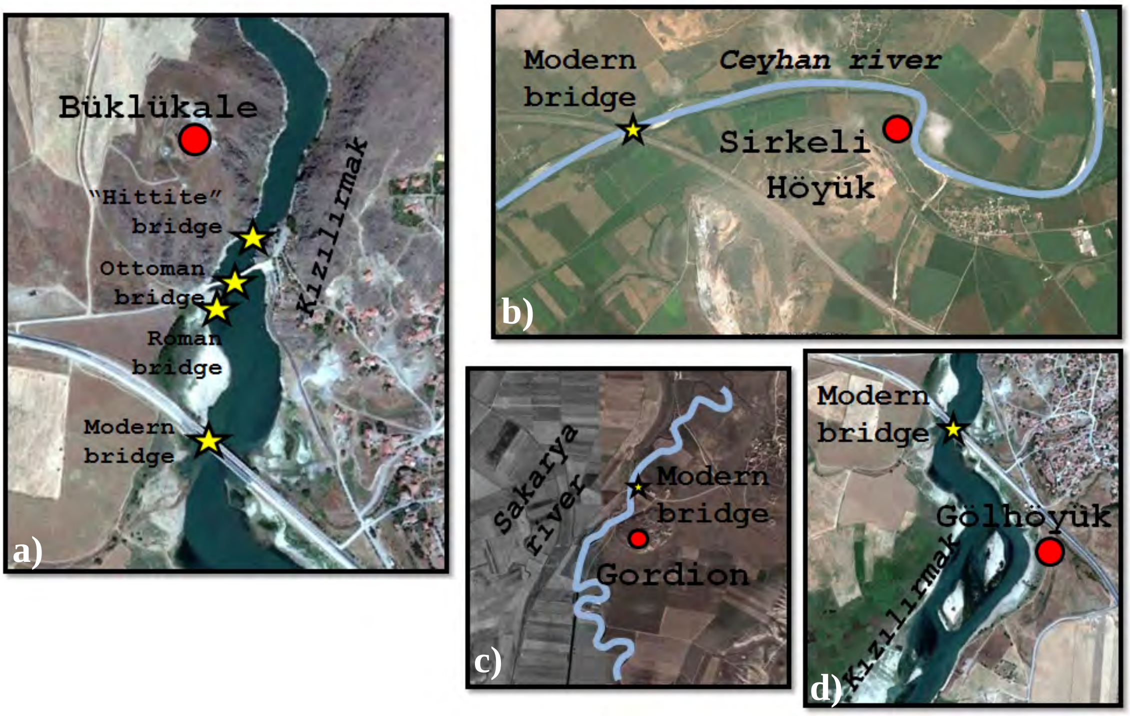


Figure 3.14 Examples of large sites with EBA occupation, located in correspondence of known later bridges (Hellenistic to modern), at different scales: a) Büklükkale on the Kızılırmak (Kırşehir), b) Sirkeli Höyük on the Ceyhan (Adana), c) Gordion on the Sakarya (Ankara), d) Gökhöyük on the Kızılırmak (Nevşehir).

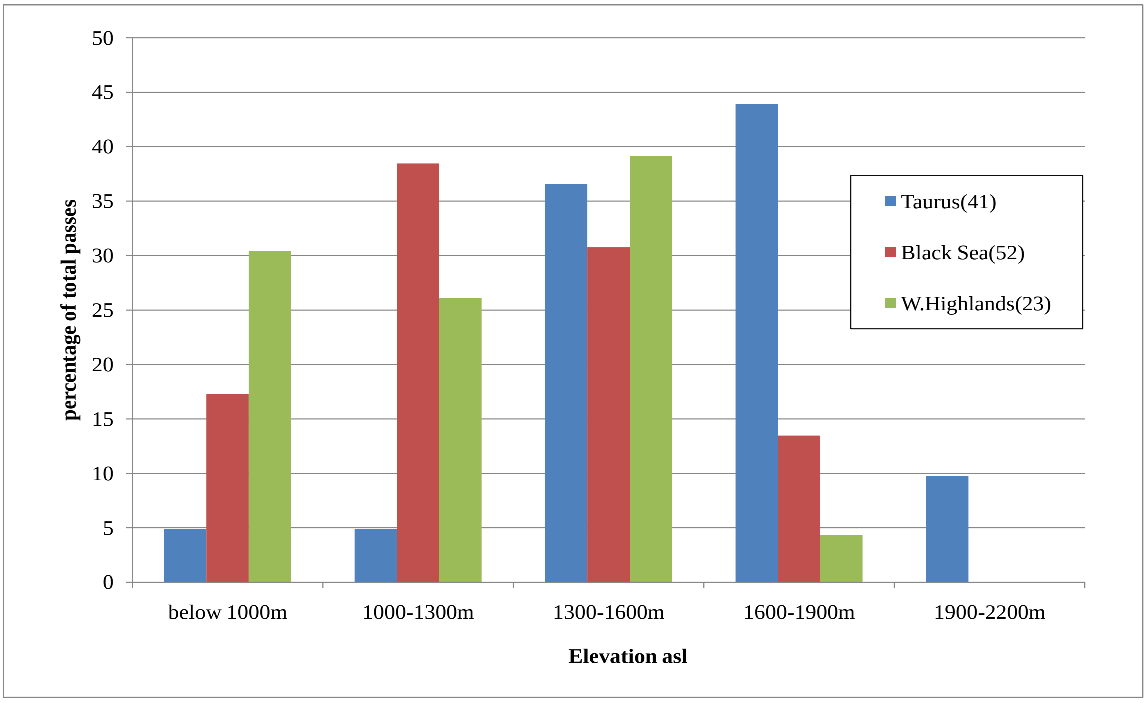


Figure 3.15 Elevation of mountain passes in the three main orographic bodies within the study area: the Taurus/Anti-Taurus Mts., the Black Sea Mts. and the western highlands. Numbers in brackets indicate the total number of passes for each area (data from the Turkish Ministry of Transportation 1:200.000 road map, www.kgm.gov.tr).

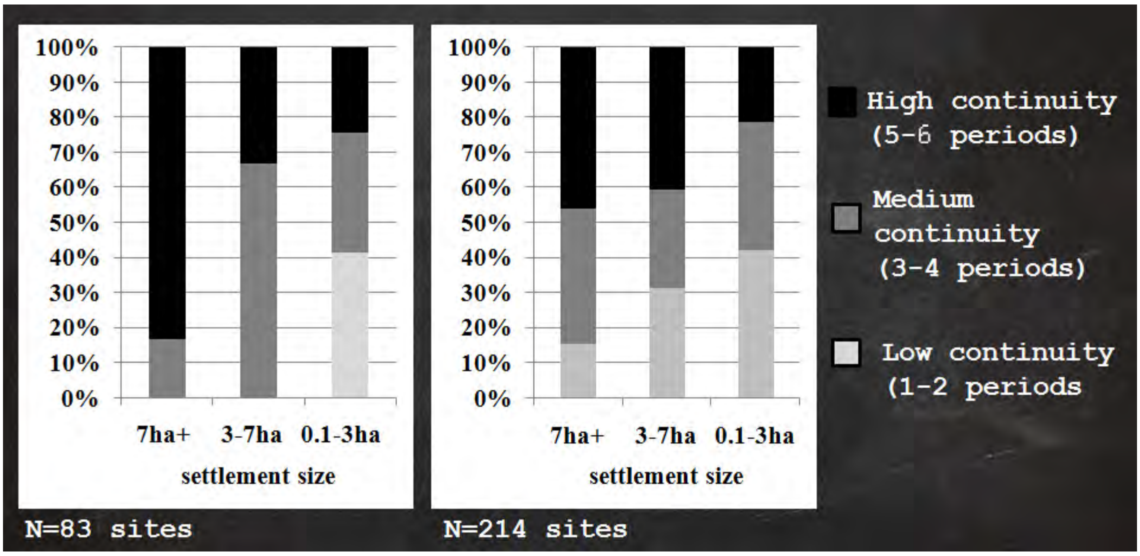


Figure 3.16 Histograms showing patterns of continuity in the occupation of sedentary settlements (höyüks) compared to their estimated mound size, in two different surveyed areas: a) the Çivril plain near Beycesultan in the Büyük Menderes valley (western Anatolia) and b) the Eskişehir and Altıntaş plains around Demircihöyük and Küllüoba (central Anatolia). Continuity is (roughly) assessed on the basis of presence of ceramic assemblages belonging to the following periods: Late Chalcolithic (c.4300-3200 BC), "EB I" (c.3200-2800 BC), "EB II" (c.2800-2400 BC), "EB III" (c.2400-1950 BC), "MBA" (c.1950-1650 BC) and "LBA" (c.1650-1200 BC). When a site has 5-6 of such periods represented in the ceramic collection, its has been assigned a "high continuity" value, 3-4 periods represent "medium continuity", 1-2 periods represent "low continuity". Data from Abay 2011; Efe 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997.

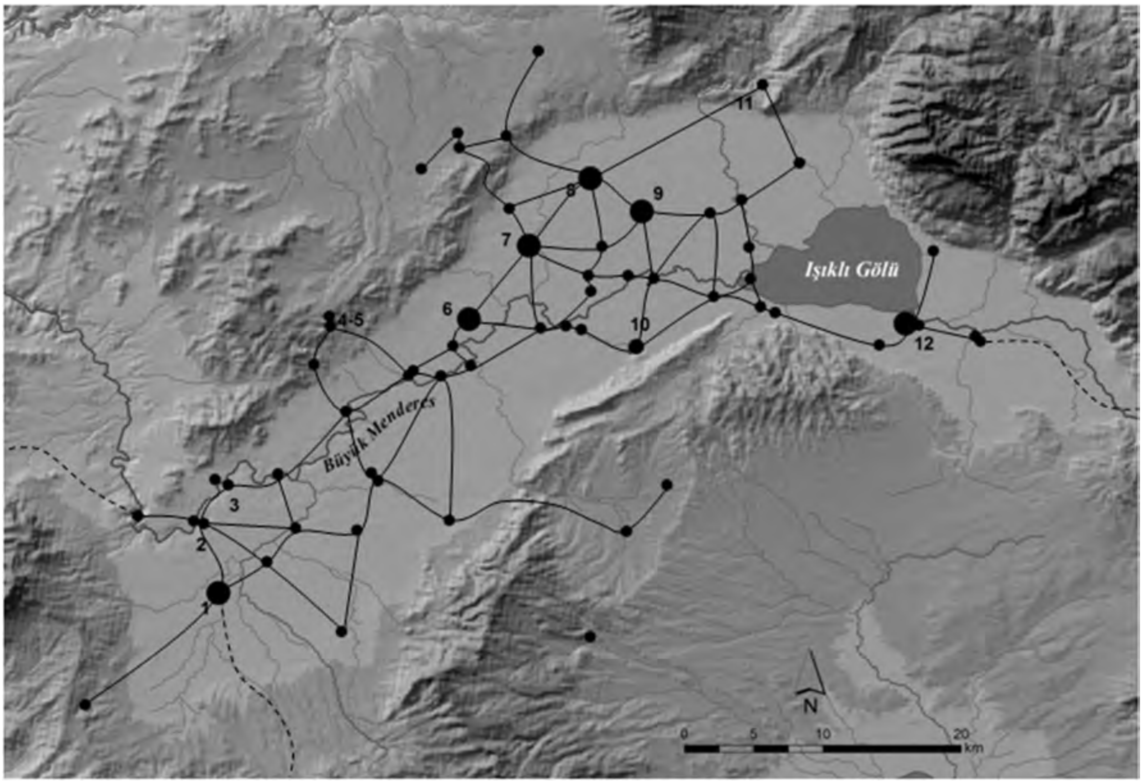


Figure 3.17 Hypothetical reconstruction of the local road network system around Beycesultan, during the 2800-2400 BC period (data on settlements from Abay 2011).

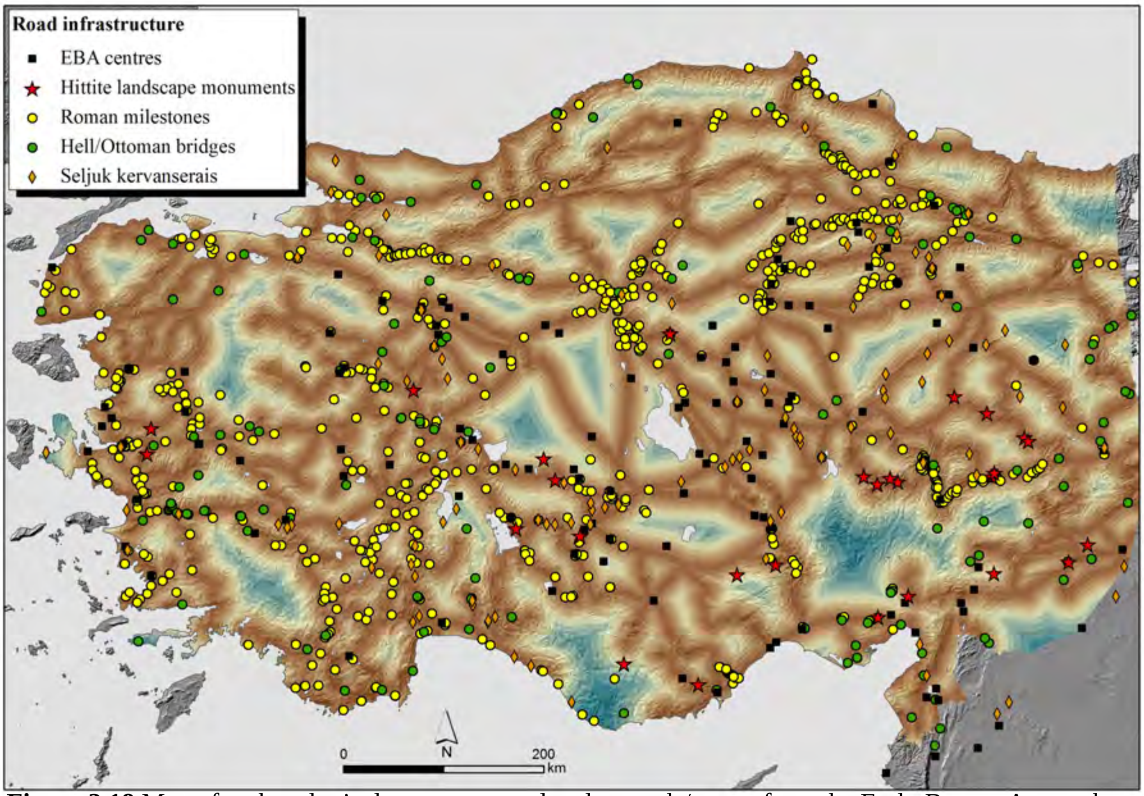


Figure 3.18 Map of archaeological monuments related to roads/routes from the Early Bronze Age to the Ottoman period. The background map shows distance from known Roman roads (dark brown=0km, dark blue=65km).

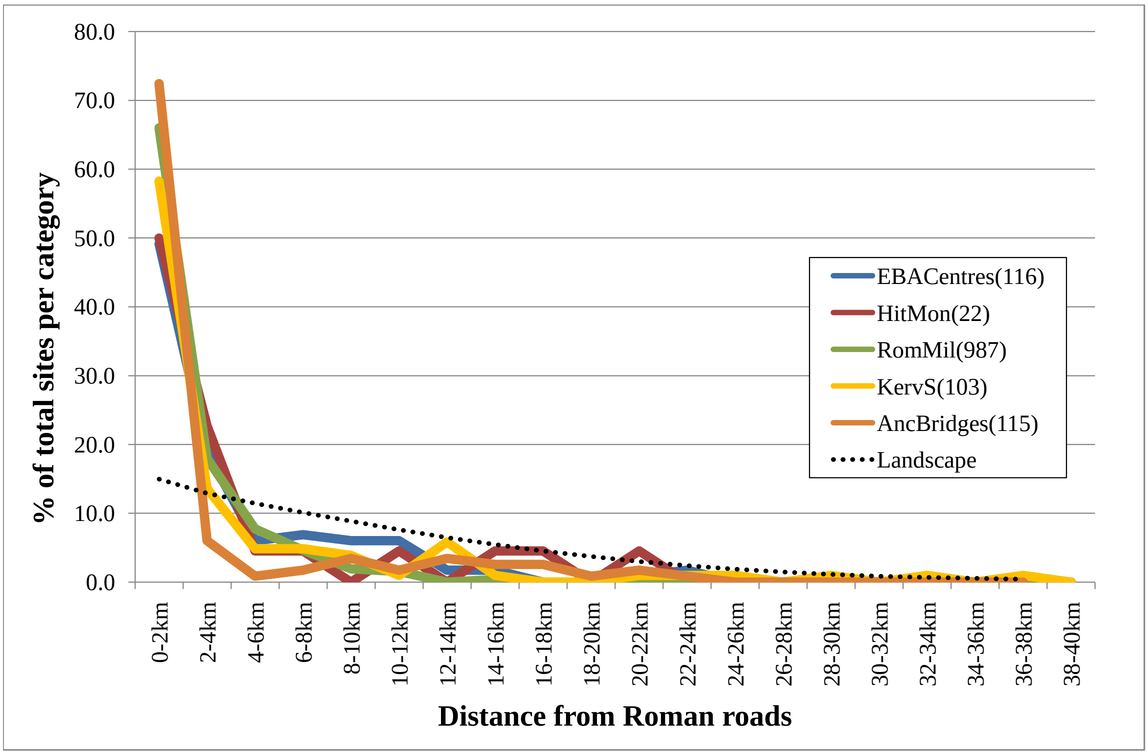


Figure 3.19 Graph showing distance from closest Roman road for each monument category and the landscape background.

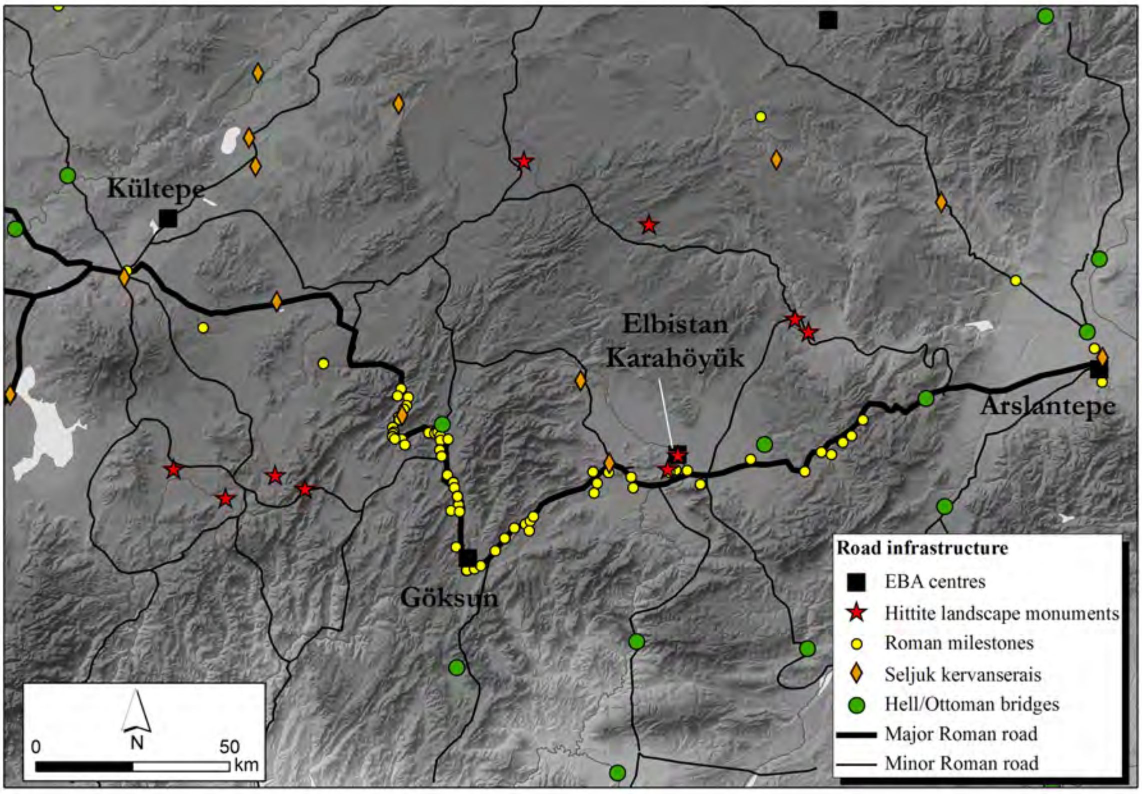


Figure 3.20 Map showing the process of reconstruction of EBA routes on the basis of later evidence: the case of the Kültepe-Arslantepe route across the Antitaurus Mountains, at the interface between central and eastern Anatolia.

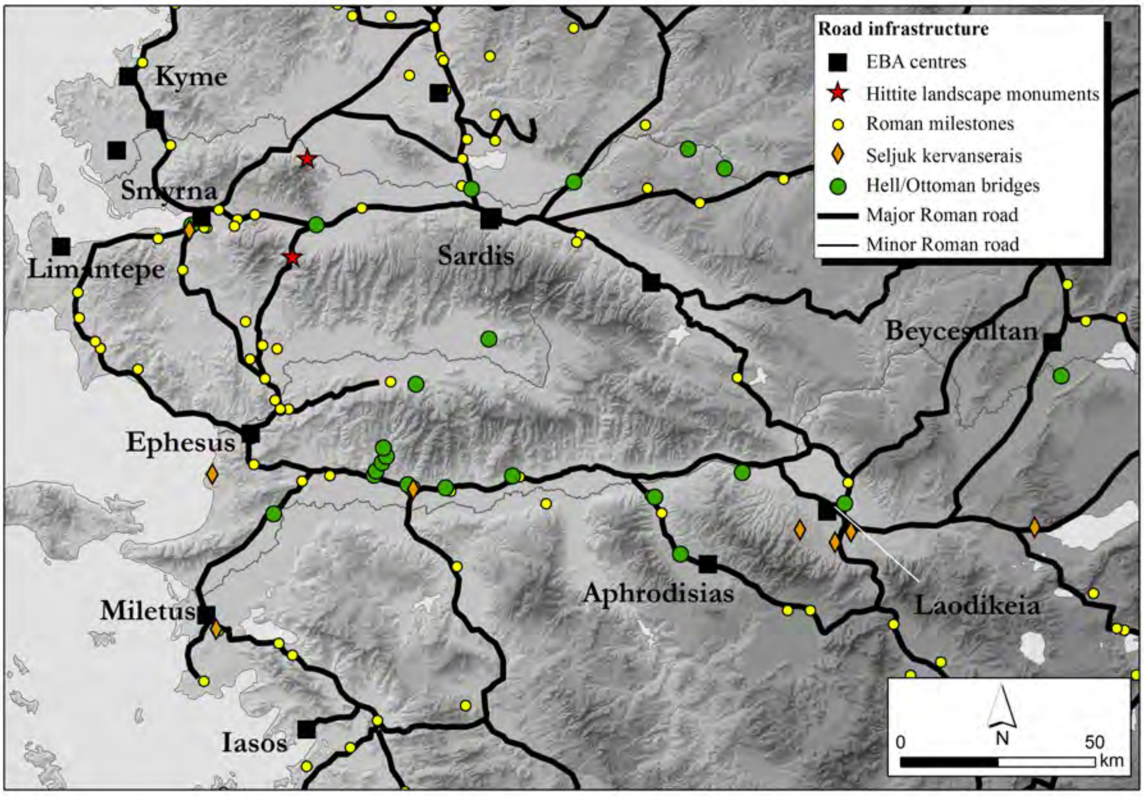


Figure 3.21 Map showing the process of reconstruction of EBA routes on the basis of later evidence: the case of the Büyük Menderes route in western Anatolia.

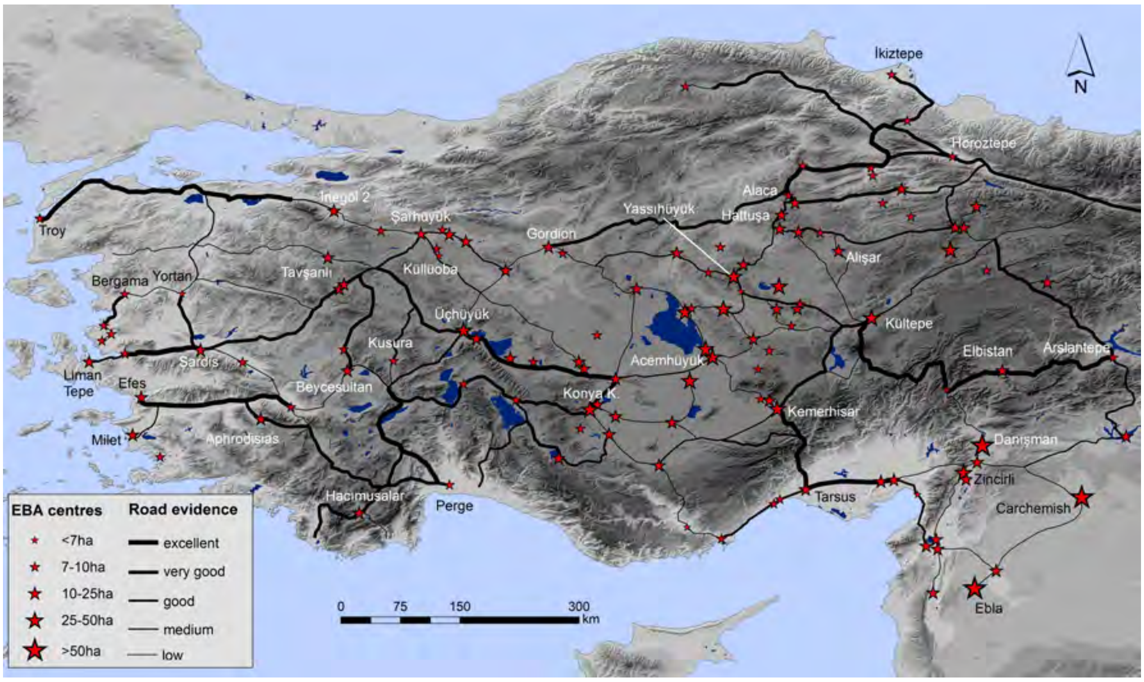


Figure 3.22 Map showing the reconstructed EBA routes, together with the location of the main EBA centres. The thickness of the lines refer to different levels of archaeological evidence for the existence of the EBA routes (from low to excellent).

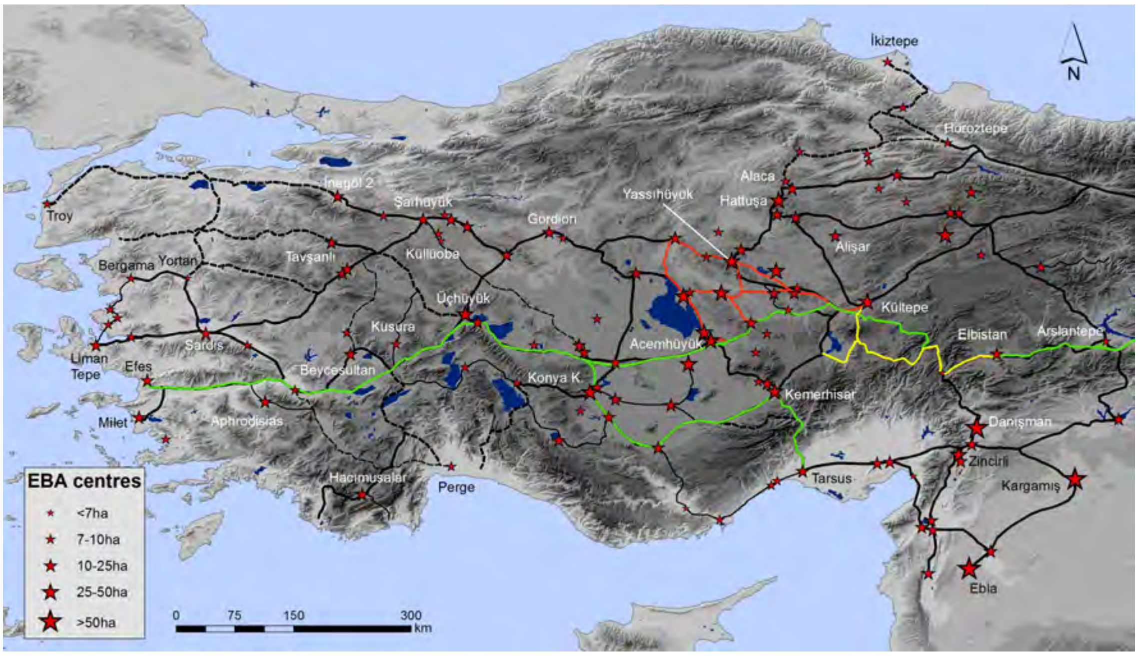


Figure 3.23 Map showing the path of the reconstructed EBA routes together with that of reconstructed Middle Bronze Age, Late Bronze Age and Persian routes (from Barjamovic 2011; French 1998). Suggested MBA routes are marked in red, LBA routes are marked in yellow, while the Persian "Royal" road is marked in green.

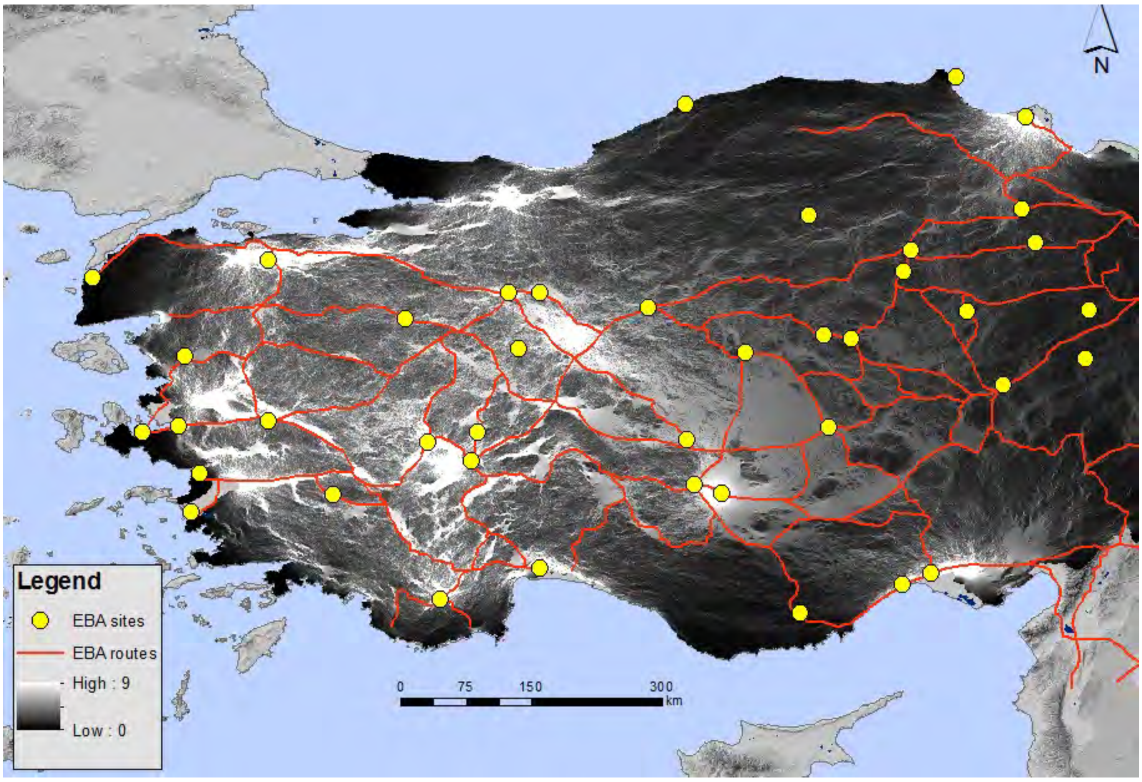


Figure 3.24 Resistance map showing areas of lower “current” (i.e. higher friction) in black and higher “current” (lowerfriction) in white, compared to known EBA sites and the proposed EBA land routes.

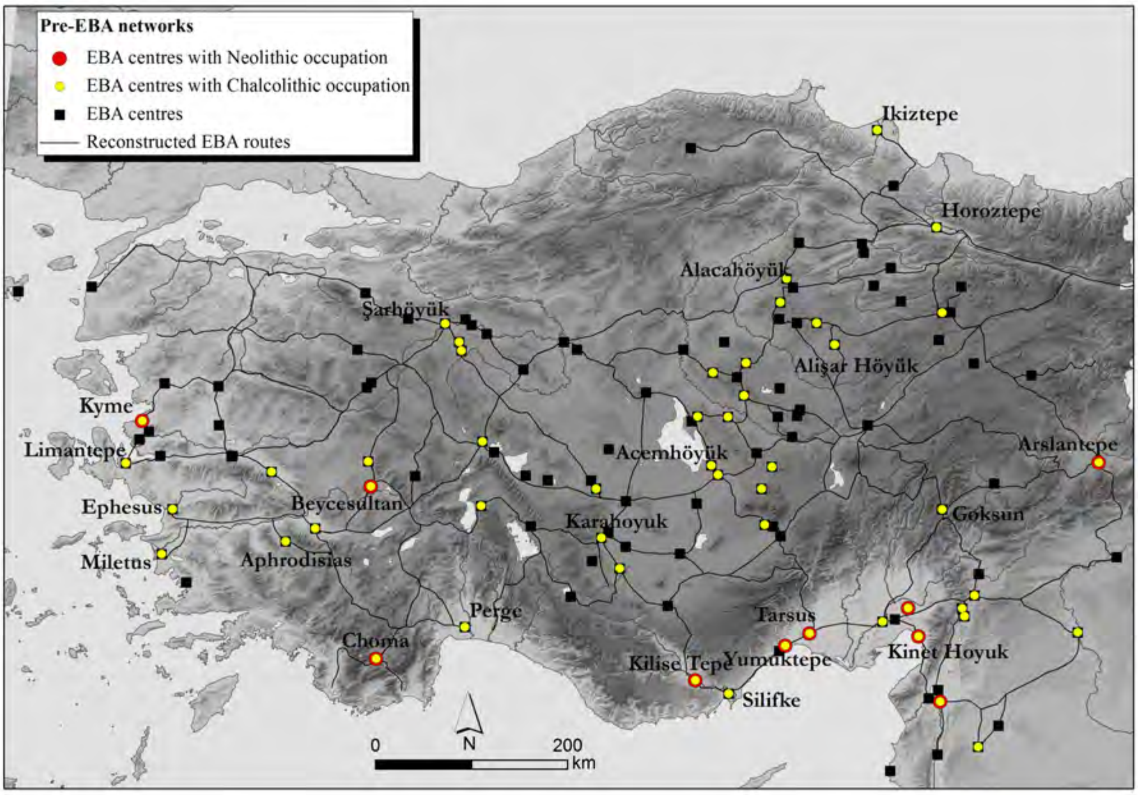


Figure 3.25 Map showing the extent of the reconstructed EBA routes, together with EBA centres that also have earlier Neolithic and/or Chalcolithic occupation.

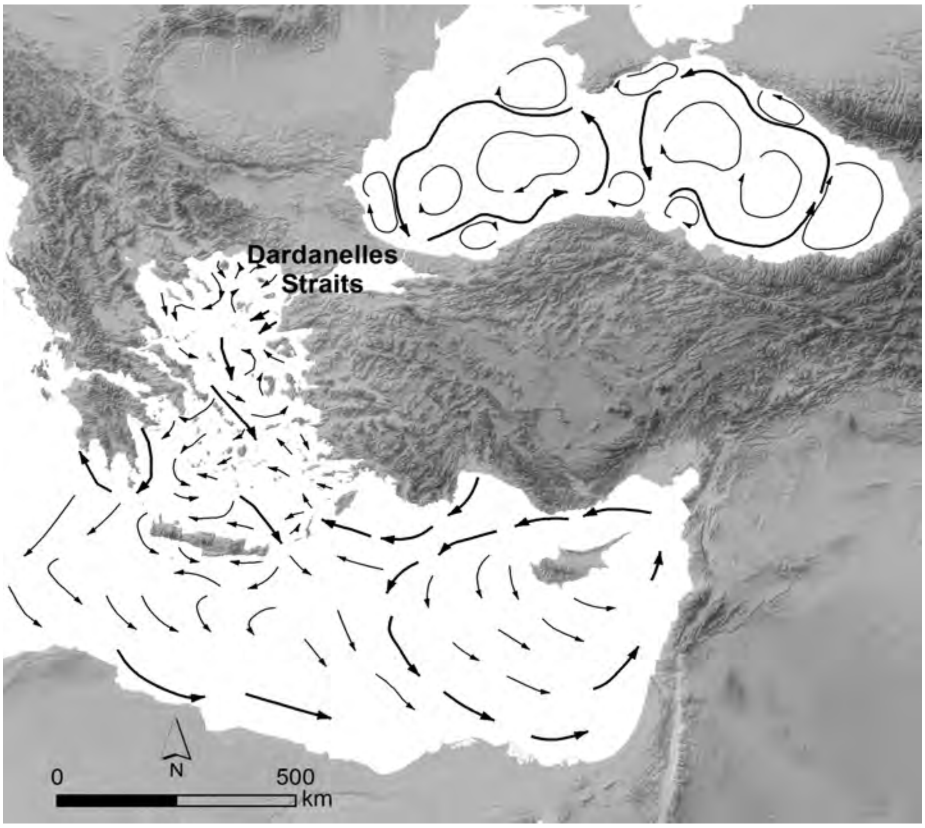


Figure 3.26 Map of main sea surface currents in the Black Sea, Aegean and Eastern Mediterranean (data collated and adapted from Bauer 2006:fig.4.3; Davis 2001:figs.2.1- 2.2).

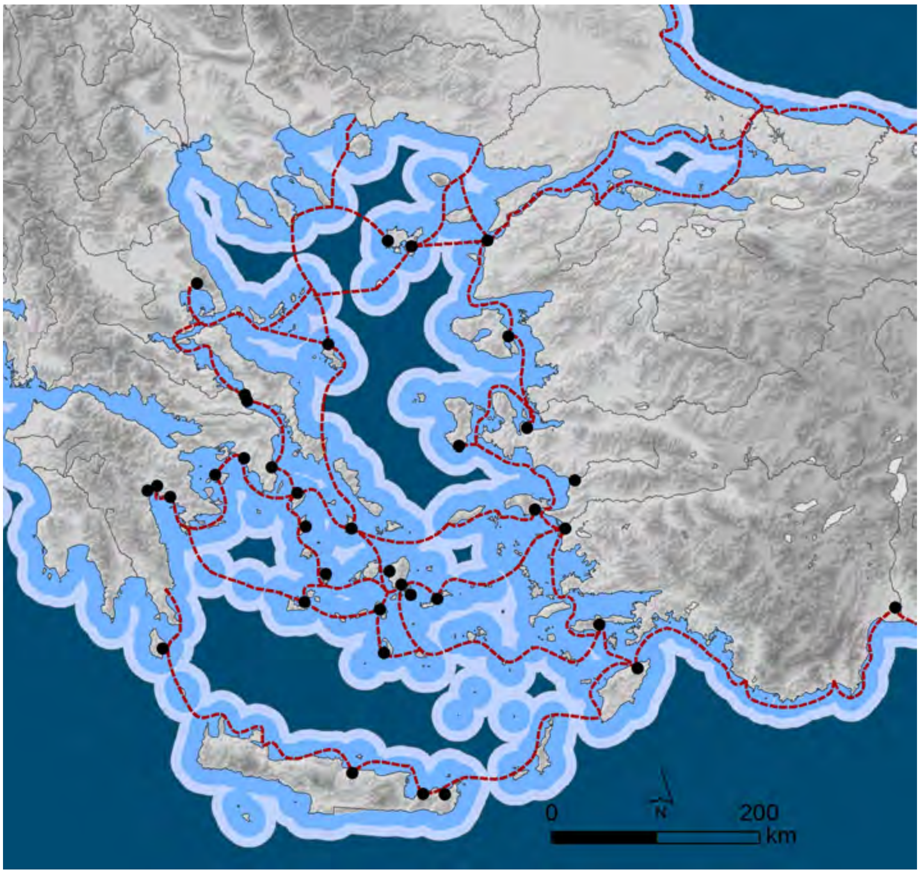


Figure 3.27 Map of inter-island distances, showing a radius of 30km (dark blue, supposed range of small oared canoes) and 50km (light blue, range of longboats) from the coast. Note that the central Aegean islands are always less than one day away from each other, promoting higher interaction in a west-east direction. Conversely, “sea deserts” between the Cyclades and Crete and between the Cyclades and the northern Aegean are clearly perceptible (map redrawn from Broodbank 2000:fig.94).

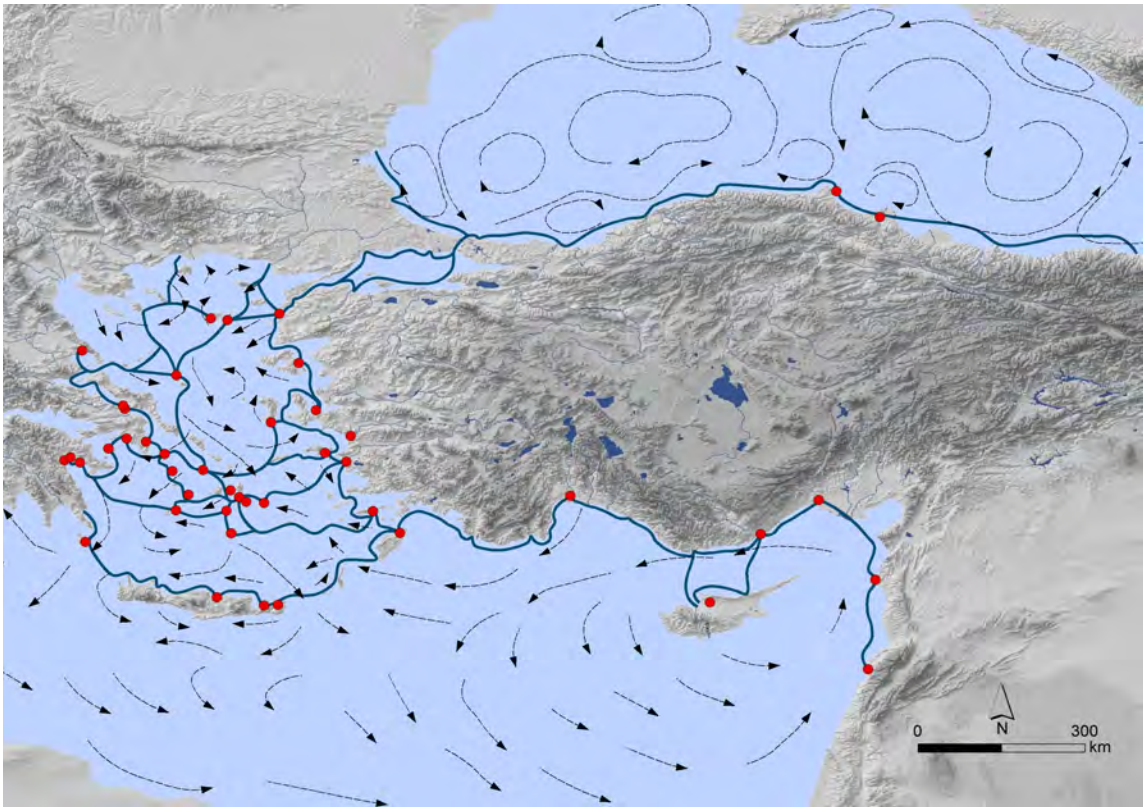


Figure 3.28 Map showing the proposed EBA sea routes and major known coastal centres. The direction of prevailing currents is also shown in the background.

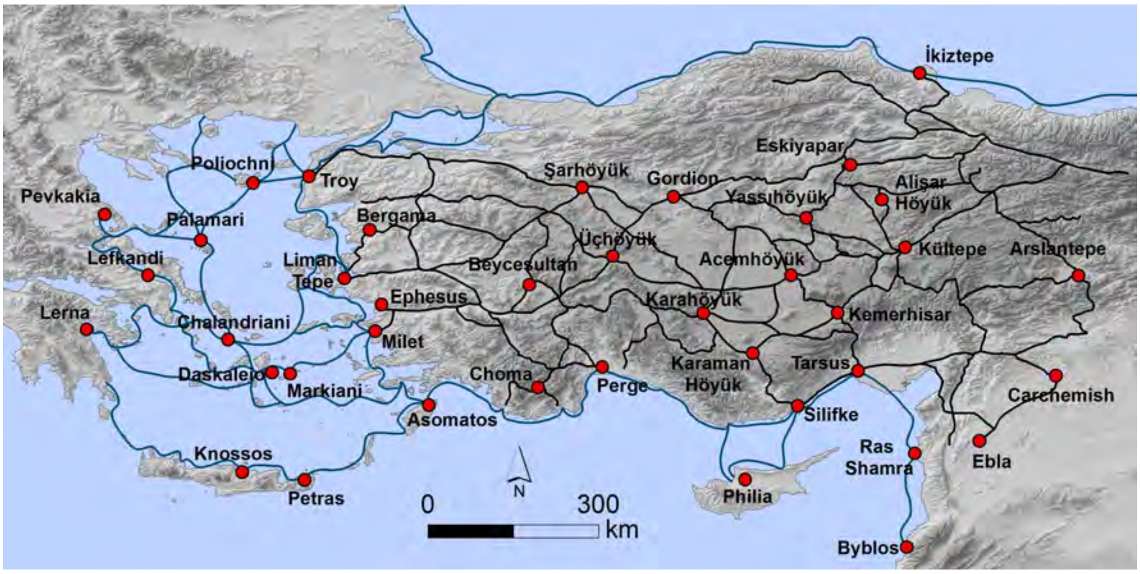


Figure 3.29 Map showing the proposed EBA land and sea routes and main centres.

Site A	***Site B***	***Distance (km)***	***Pedestrian (days)***		***Human porter (days)***		***Ox-cart (days)***		***Pack donkey (days)***	
			min	***max***	***min***	***max***	***min***	***max***	***min***	***max***
Şarhöyük	Bergama	353	8.8	11.0	14.7	17.7	11.0	22.1	10.1	14.1
Şarhöyük	Troy	427	10.7	13.3	17.8	21.4	13.3	26.7	12.2	17.1
Şarhöyük	Liman Tepe	358	9.0	11.2	14.9	17.9	11.2	22.4	10.2	14.3
Şarhöyük	Gordion	154	3.9	4.8	6.4	7.7	4.8	9.6	4.4	6.2
Şarhöyük	Üçhöyük	157	3.9	4.9	6.5	7.9	4.9	9.8	4.5	6.3
Acemhöyük	Şarhöyük	392	9.8	12.3	16.3	19.6	12.3	24.5	11.2	15.7
Acemhöyük	Kültepe	183	4.6	5.7	7.6	9.2	5.7	11.4	5.2	7.3
Acemhöyük	Kemerhisar	109	2.7	3.4	4.5	5.5	3.4	6.8	3.1	4.4
Acemhöyük	Tarsus	226	5.7	7.1	9.4	11.3	7.1	14.1	6.5	9.0
Acemhöyük	K.-Karahöyük	151	3.8	4.7	6.3	7.6	4.7	9.4	4.3	6.0
Acemhöyük	Üçhöyük	276	6.9	8.6	11.5	13.8	8.6	17.3	7.9	11.0
Tarsus	Kemerhisar	119	3.0	3.7	5.0	6.0	3.7	7.4	3.4	4.8
Tarsus	Carchemish	309	7.7	9.7	12.9	15.5	9.7	19.3	8.8	12.4
Tarsus	Ebla	301	7.5	9.4	12.5	15.1	9.4	18.8	8.6	12.0
Kültepe	Arslantepe	389	9.7	12.2	16.2	19.5	12.2	24.3	11.1	15.6
Kültepe	Carchemish	439	11.0	13.7	18.3	22.0	13.7	27.4	12.5	17.6
Kültepe	Alişar Höyük	115	2.9	3.6	4.8	5.8	3.6	7.2	3.3	4.6
Kültepe	Eskiyapar	220	5.5	6.9	9.2	11.0	6.9	13.8	6.3	8.8
Kültepe	Yassıhöyük	166	4.2	5.2	6.9	8.3	5.2	10.4	4.7	6.6
Yassıhöyük	Eskiyapar	121	3.0	3.8	5.0	6.1	3.8	7.6	3.5	4.8
Yassıhöyük	Gordion	206	5.2	6.4	8.6	10.3	6.4	12.9	5.9	8.2
Eskiyapar	Ikiztepe	209	5.2	6.5	8.7	10.5	6.5	13.1	6.0	8.4
Üçhöyük	Beycesultan	162	4.1	5.1	6.8	8.1	5.1	10.1	4.6	6.5
Üçhöyük	Ephesus	379	9.5	11.8	15.8	19.0	11.8	23.7	10.8	15.2
Beycesultan	Ephesus	240	6.0	7.5	10.0	12.0	7.5	15.0	6.9	9.6
Beycesultan	Liman Tepe	176	4.4	5.5	7.3	8.8	5.5	11.0	5.0	7.0
Beycesultan	Hacımusalar	251	6.3	7.8	10.5	12.6	7.8	15.7	7.2	10.0
K.-Karahöyük	Antalya plain	230	5.8	7.2	9.6	11.5	7.2	14.4	6.6	9.2
K.-Karahöyük	Üçhöyük	221	5.5	6.9	9.2	11.1	6.9	13.8	6.3	8.8
K.-Karahöyük	Karaman H.	104	2.6	3.3	4.3	5.2	3.3	6.5	3.0	4.2
K.-Karahöyük	Şarhöyük	234	5.9	7.3	9.8	11.7	7.3	14.6	6.7	9.4
Karaman H.	Kemerhisar	147	3.7	4.6	6.1	7.4	4.6	9.2	4.2	5.9

Figure 3.30 Table providing estimated travel times between major EBA centres with different transport carriers and through the proposed EBA land routes. Cf. figure 3.29 for the location of the mentioned sites.

Site A	Site B	Distance (km)	Sailboat (days)			Small canoe (days)		
			min	max	weather	min	max	weather
Tarsus	Ras Shamra	185	3.1	12.3	+1/4 days	7.4	9.3	+2/3 days
Tarsus	Byblos	360	6.0	24.0	+2/8 days	14.4	18.0	+5/6 days
Tarsus	Silifke	110	1.8	7.3	+1/2 days	4.4	5.5	+1/2 days
Silifke	N. Cyprus	110	1.8	7.3	+1/2 days	4.4	5.5	+1/2 days
Silifke	Perge	340	5.7	22.7	+2/7 days	13.6	17.0	+5/6 days
Perge	Asomatos	400	6.7	26.7	+2/9 days	16.0	20.0	+5/7 days
Asomatos	Miletus	220	3.7	14.7	+1/5 days	8.8	11.0	+3/4 days
Asomatos	Petras on Crete	280	4.7	18.7	+1/6 days	11.2	14.0	+4/5 days
Asomatos	Daskaleio-Kavos	290	4.8	19.3	+2/6 days	11.6	14.5	+4/5 days
Miletus	Limantepe	280	4.7	18.7	+1/6 days	11.2	14.0	+4/5 days
Limantepe	Thermi	100	1.7	6.7	+1/2 days	4.0	5.0	+1/2 days
Thermi	Troy	130	2.2	8.7	+1/3 days	5.2	6.5	+1/2 days
Troy	Poliochni	75	1.3	5.0	+1/2 days	3.0	3.8	+1 day
Troy	Bosphorus	350	5.8	23.3	+2/8 days	14.0	17.5	+5/6 days
Troy	Ikiztepe	980	16.3	65.3	+5/22 days	39.2	49.0	+13/16 days
Poliochni	Palamari	130	2.2	8.7	+1/3 days	5.2	6.5	+1/2 days
Poliochni	Chalkidiki	70	1.2	4.7	+1/2 days	2.8	3.5	+1 day
Miletus	Markiani	160	2.7	10.7	+1/3 days	6.4	8.0	+2/3 days
Heraion	Chalandriani	210	3.5	14.0	+1/5 days	8.4	10.5	+3/4 days

Figure 3.31 Table providing estimated travel times between major EBA centres with different transport carriers through the proposed EBA sea routes. Delay caused by weather conditions (estimated at 1/3 of the total time) is also indicated. Cf. figure 3.29 for the location of the mentioned sites.

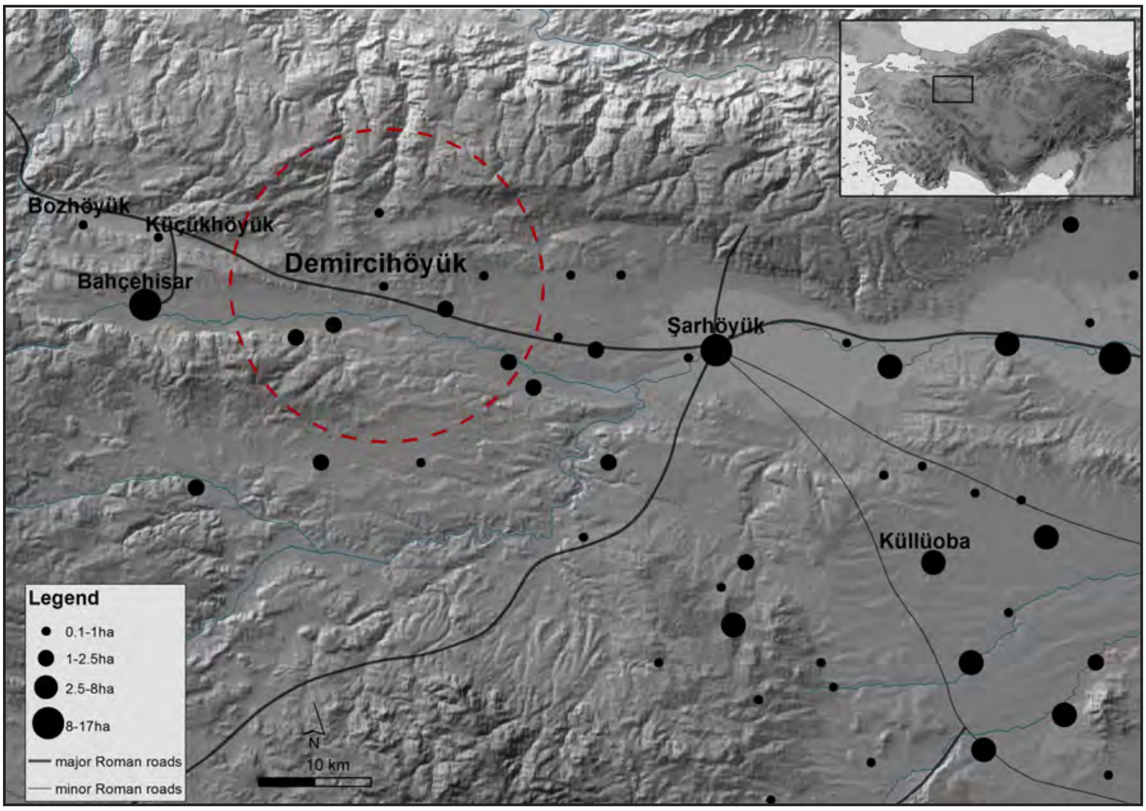


Figure 4.1. Map showing the position of Demircihöyük and nearby sites mentioned in the text. The red circle indicates a 10km radius from the site.

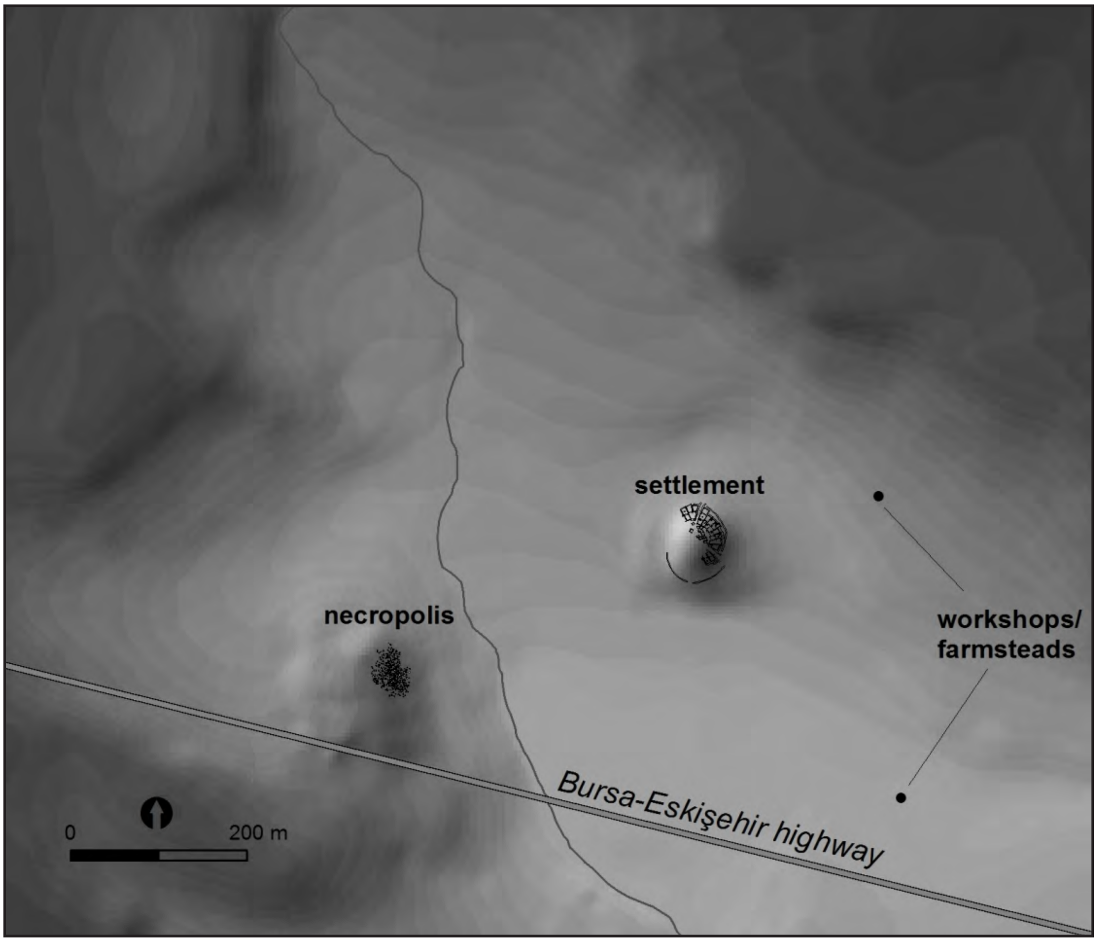


Figure 4.2. Map showing the location of Demircihöyük's settlement and necropolis in relation to the surrounding plain.

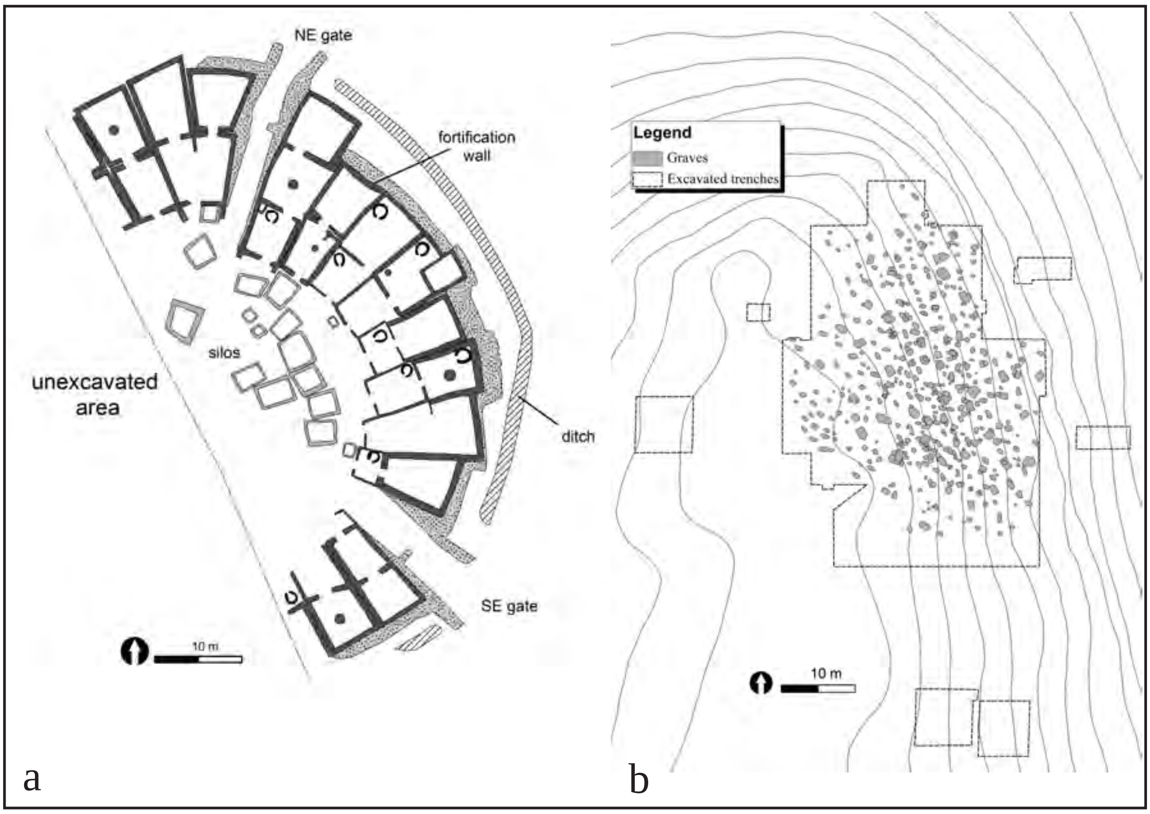


Figure 4.3 Plans of the settlement (a) and the necropolis (b) at Demircihöyük (modified after Korfmann 1983:fig.343; Seeher 2000:plan 1).

<table>
<tr><th>Demircihöyük</th><th>No. 14C samples</th><th>Estimated date</th><th>Troy</th><th>Küllüoba</th><th>Karataş</th><th>Anatolian periodisation</th></tr>
<tr><td>phase D</td><td>-</td><td>2870-2850 cal BC</td><td></td><td>West Tr. 3/ V C</td><td rowspan="2"></td><td rowspan="7">EB I</td></tr>
<tr><td>phase E1-2</td><td>30</td><td>2850-2830 cal BC</td><td rowspan="4">I a-c</td><td>West Tr. 2/ V B</td></tr>
<tr><td>phase F1</td><td>1</td><td>2830-2810 cal BC</td><td rowspan="4">V A</td><td rowspan="3">I-II</td></tr>
<tr><td>phase F2</td><td>-</td><td>2810-2790 cal BC</td></tr>
<tr><td>phase F3</td><td>-</td><td>2790-2770 cal BC</td></tr>
<tr><td>phase G</td><td>-</td><td>2770-2750 cal BC</td><td rowspan="3">I d-e</td><td rowspan="3">III</td></tr>
<tr><td>phase H</td><td>25</td><td>2750-2730 cal BC</td><td rowspan="2">IV G</td></tr>
<tr><td>phase I</td><td>-</td><td>2730-2710 cal BC</td><td rowspan="5">EB II early</td></tr>
<tr><td>phase K1</td><td>-</td><td>2710-2690 cal BC</td><td rowspan="7">I g-k</td><td rowspan="2">IV F</td><td rowspan="3">IV</td></tr>
<tr><td>phase K2</td><td>2</td><td>2690-2670 cal BC</td></tr>
<tr><td>phase L</td><td>4</td><td>2670-2650 cal BC</td><td>IV E</td></tr>
<tr><td>phase M</td><td>2</td><td>2650-2630 cal BC</td><td rowspan="2">IV D</td><td rowspan="2">V:1</td><td rowspan="4">EB II middle</td></tr>
<tr><td>phase N</td><td>-</td><td>2630-2610 cal BC</td></tr>
<tr><td>phase O</td><td>-</td><td>2610-2590 cal BC</td><td rowspan="2">IV C</td><td rowspan="2">V:2</td></tr>
<tr><td>phase P</td><td>-</td><td>2590-2570 cal BC</td></tr>
<tr><td>phase Q</td><td>-</td><td>2570-2550 cal BC</td><td>II a</td><td>IV B</td><td>V:3</td><td>EB II late</td></tr>
</table>

Figure 4.4 Table showing the estimated calendric dates for the different architectural phases at Demircihöyük, compared with other major stratigraphic pillars (after Efe and Fidan 2008; Weninger 1987).

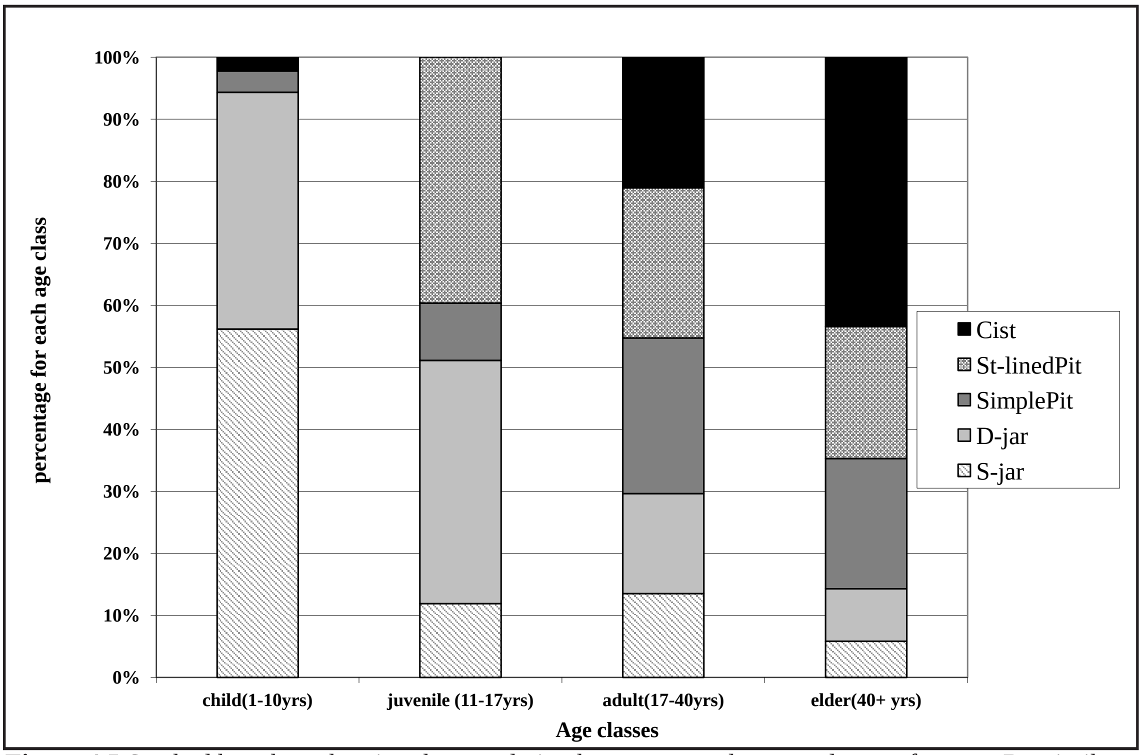


Figure 4.5 Stacked bar chart showing the correlation between age classes and grave forms at Demircihöyük. Cist= stone cist, St-linedPit= stone-lined pit, D-jar= double jar, S-jar= simple jar.

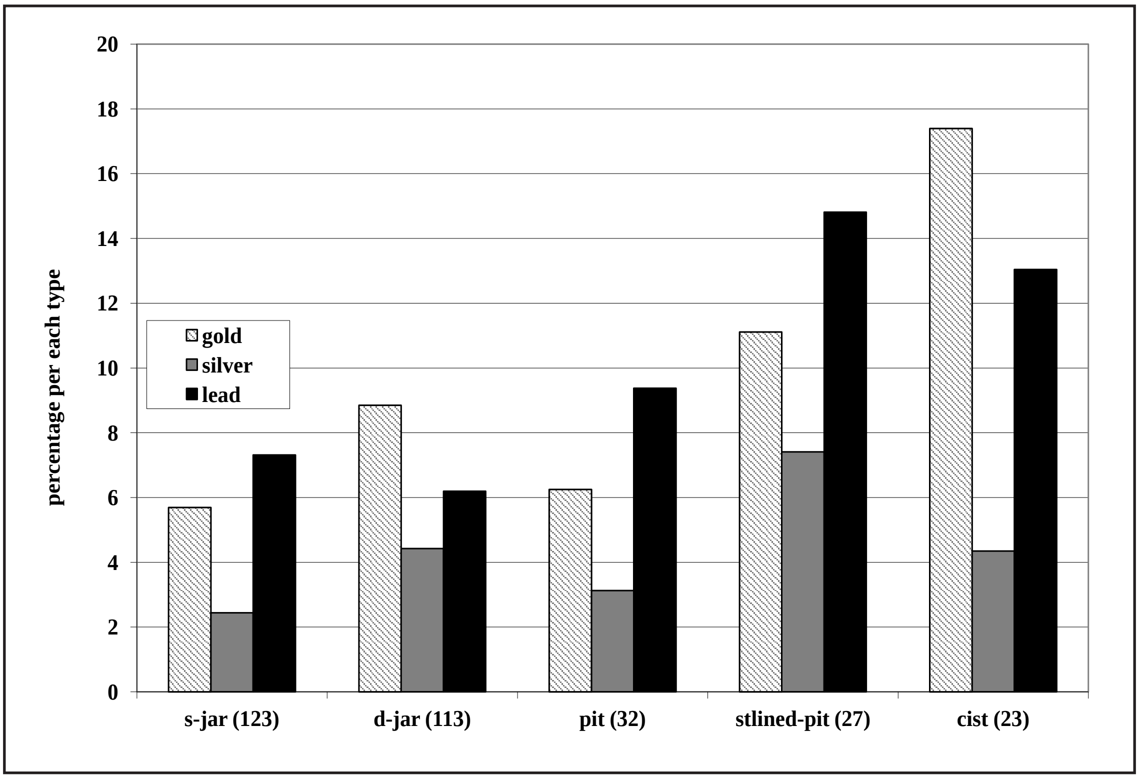


Figure 4.6 Bar chart showing the association between grave forms and objects in precious metals at Demircihöyük. S-jar= single jar, D-jar= double jar, stlinedpit= stone-lined pit.

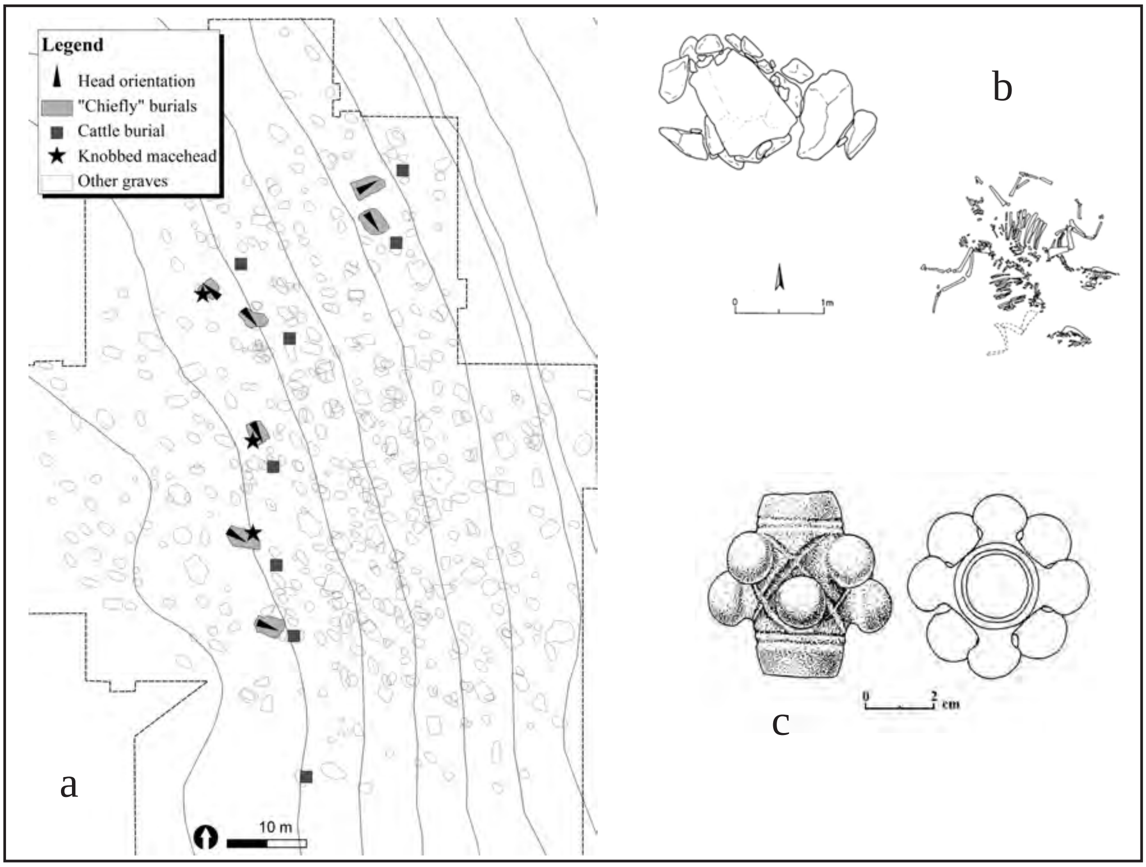


Figure 4.7 a) Plan of the cemetery area at Demircihöyük showing the location of the suggested "chiefly" burials in relation to the location of the cattle burials, the orientation of the heads of the deceased and the knobbed maces. b) Plan of cattle burial and grave 321 (after Seeher 2000:fig.10). c) Knobbed macehead from grave 335 (after Seeher 2000:fig.40).

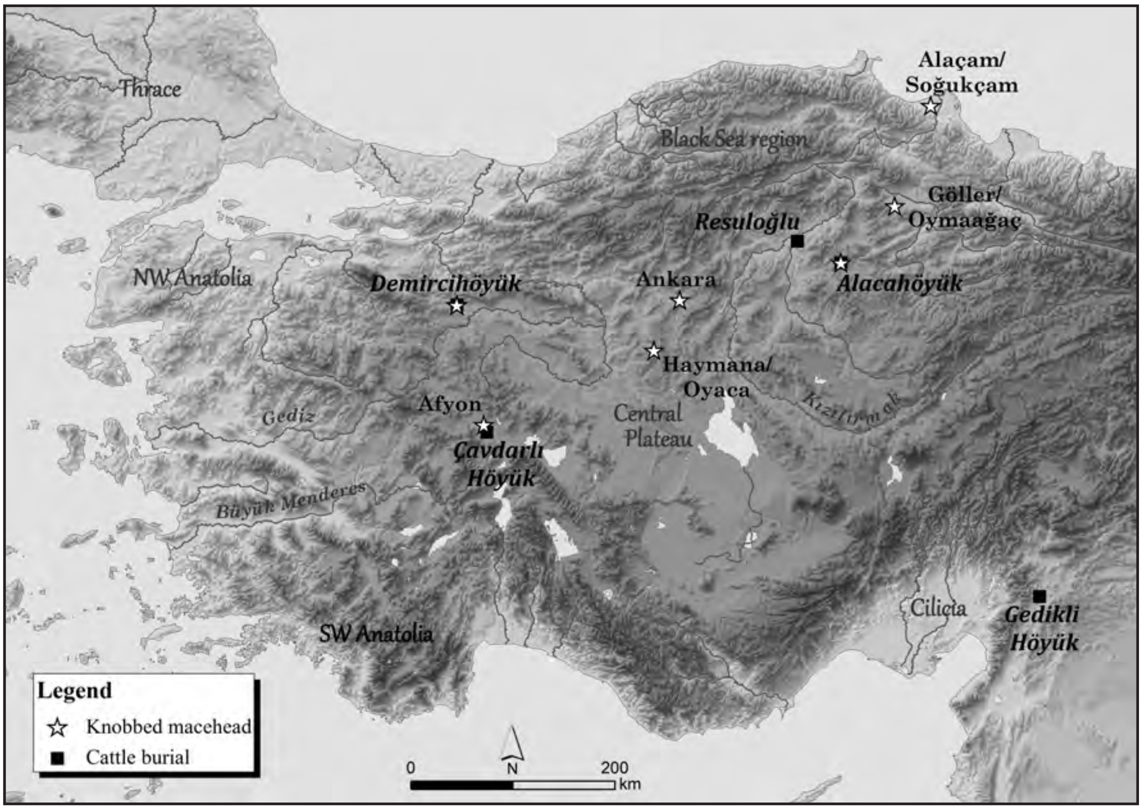


Figure 4.8 Map showing the distribution of known knobbed maces and cattle burials in EBA sites.

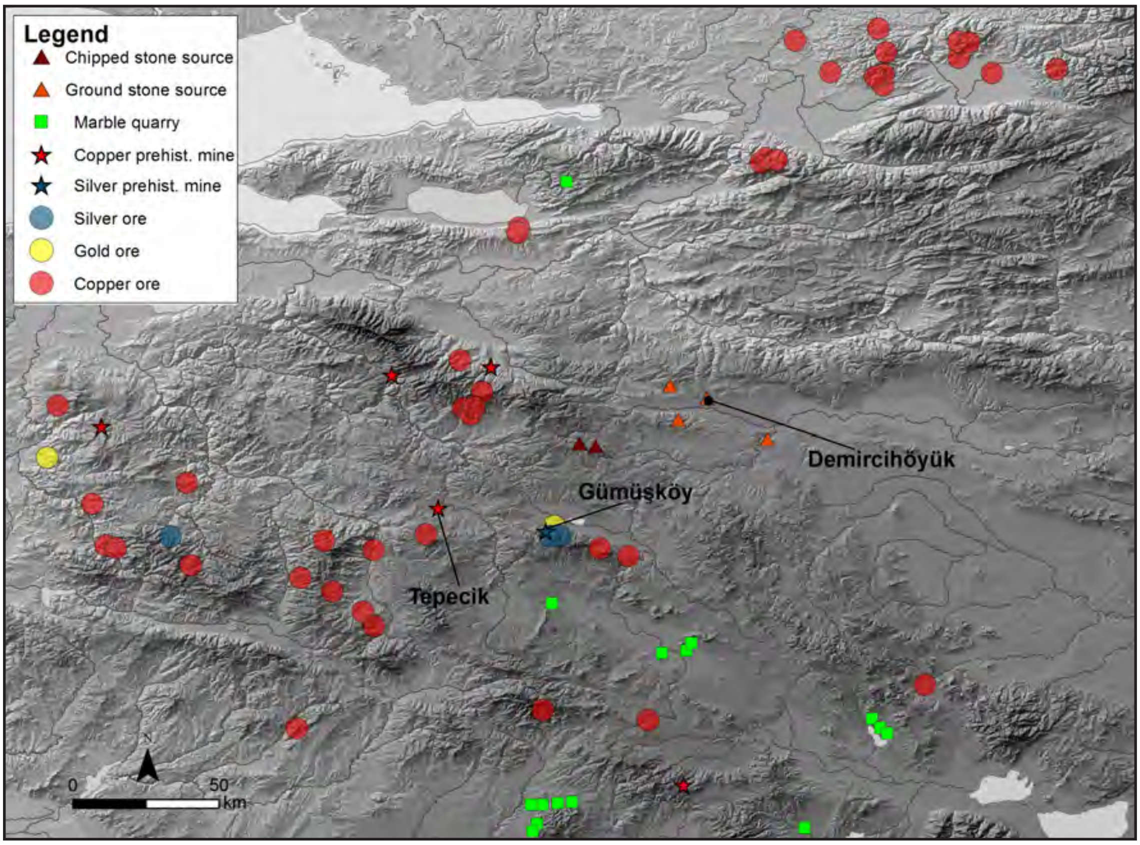


Figure 4.9 Map showing the location of known sources of raw materials near Demircihöyük, and the position of other sites mentioned in the text.

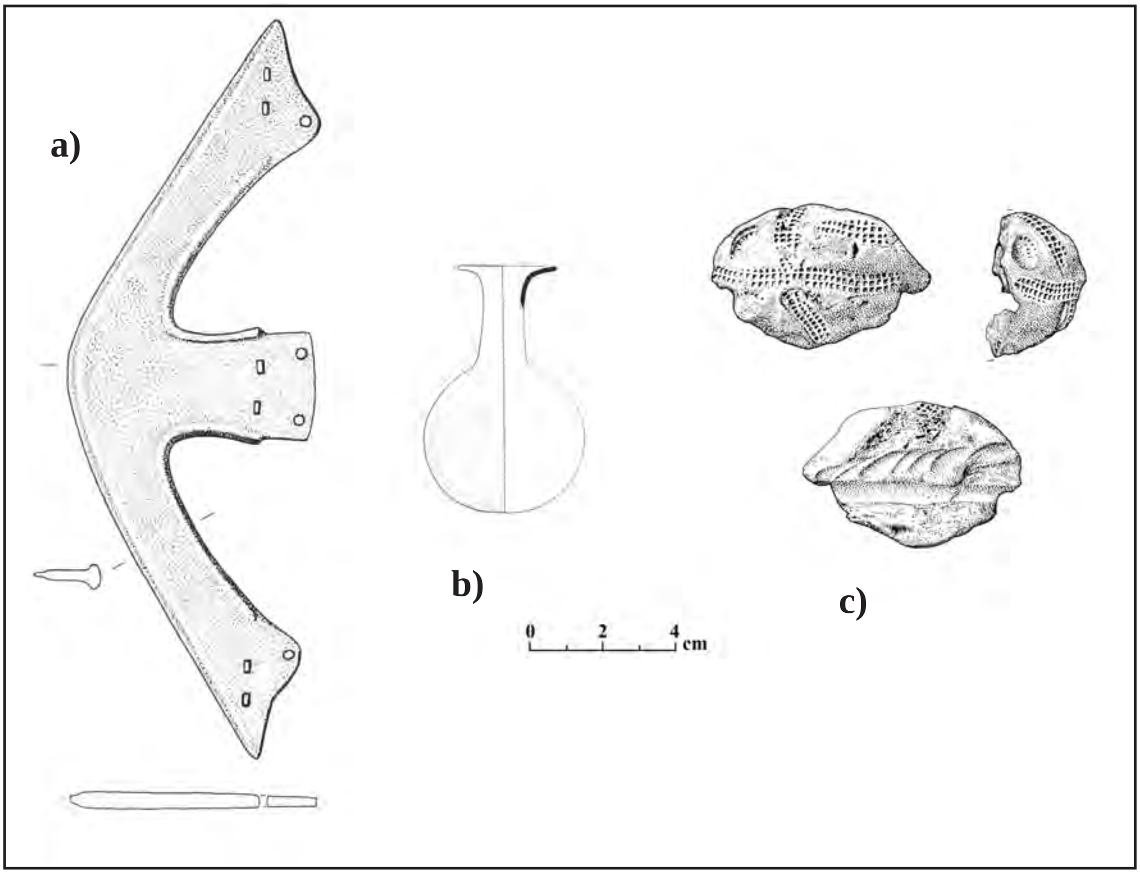


Figure 4.10 a) Crescent-shaped axe from grave 100, b) lead bottle from grave 100, c) clay bulla from settlement phase F2 (after Seeher 2000:fig.23.e-f; Obladen-Kauder 1996:fig.136.6).

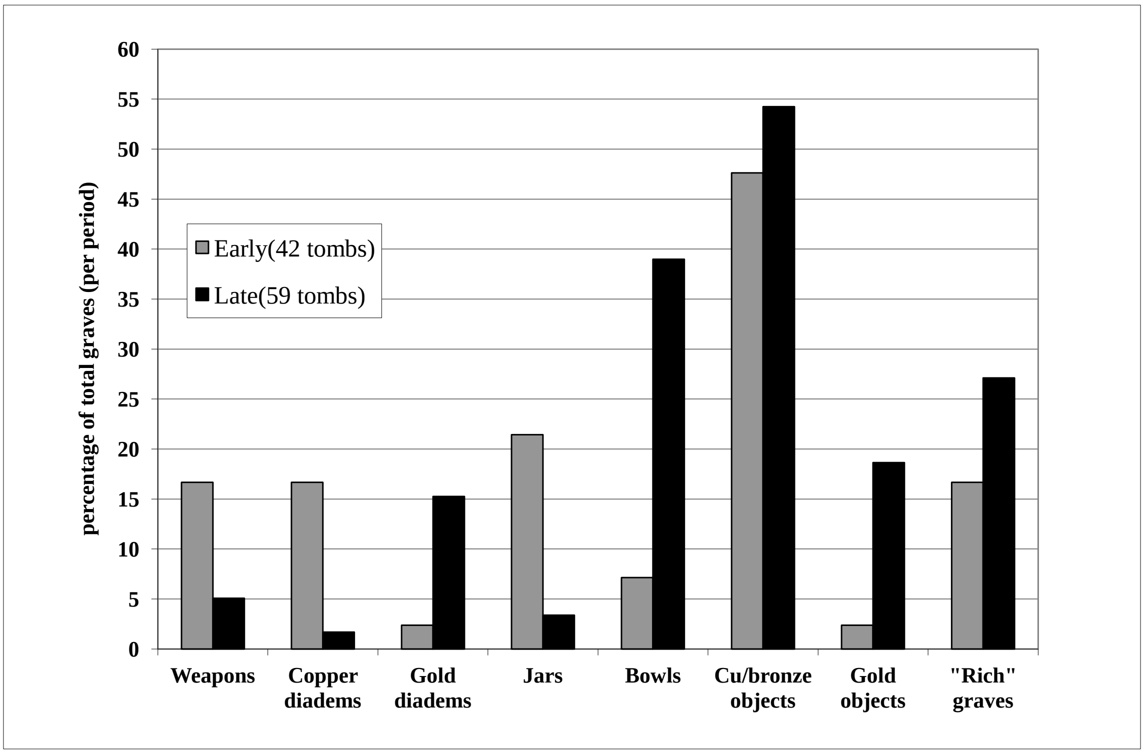


Figure 4.11 Bar chart showing association of grave goods in graves in the early and late phases of the necropolis at Demircihöyük. "Rich graves"= burials with more than 2 objects per interment.

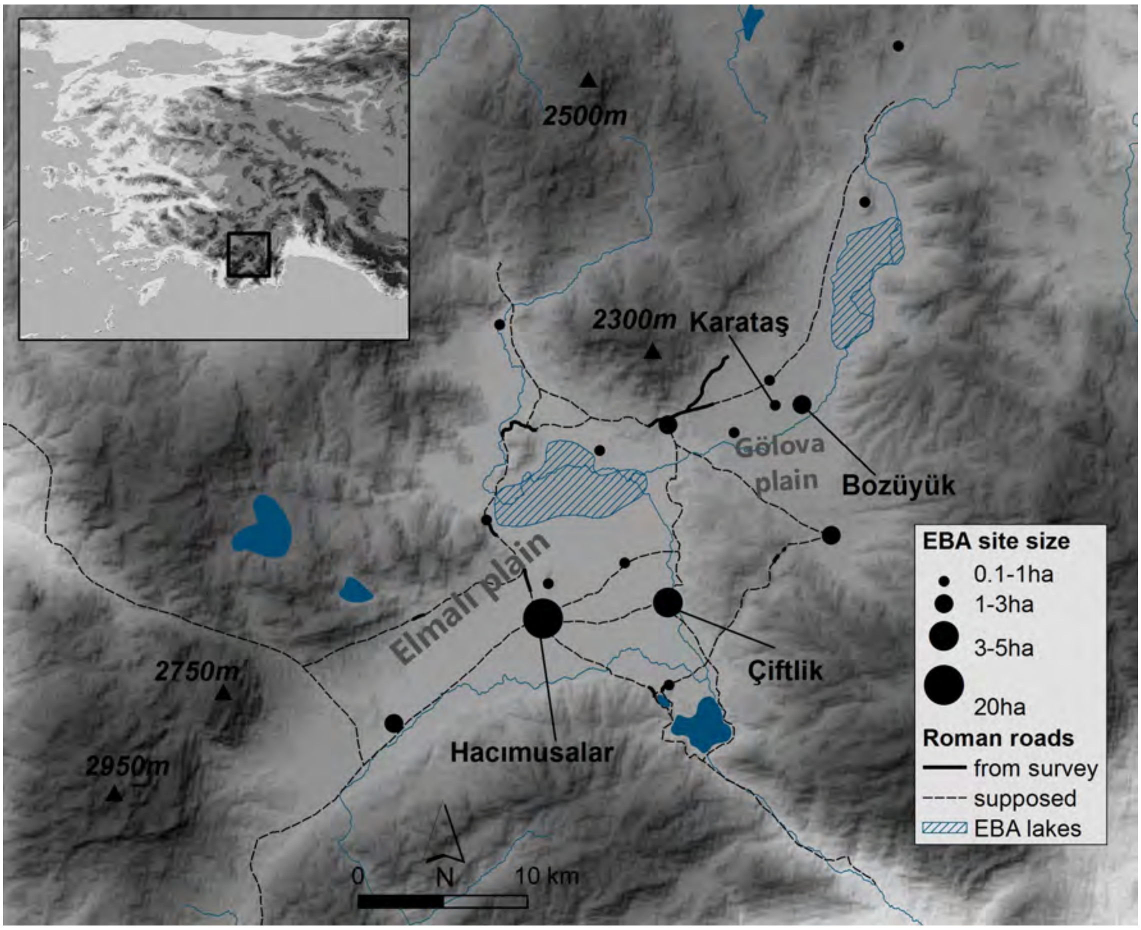


Figure 4.12 Map showing the location of Elmalı-Karataş together with known EBA sites in the Gölova and Elmalı plains (after Eslick 2009:fig.1; Foss 2006).

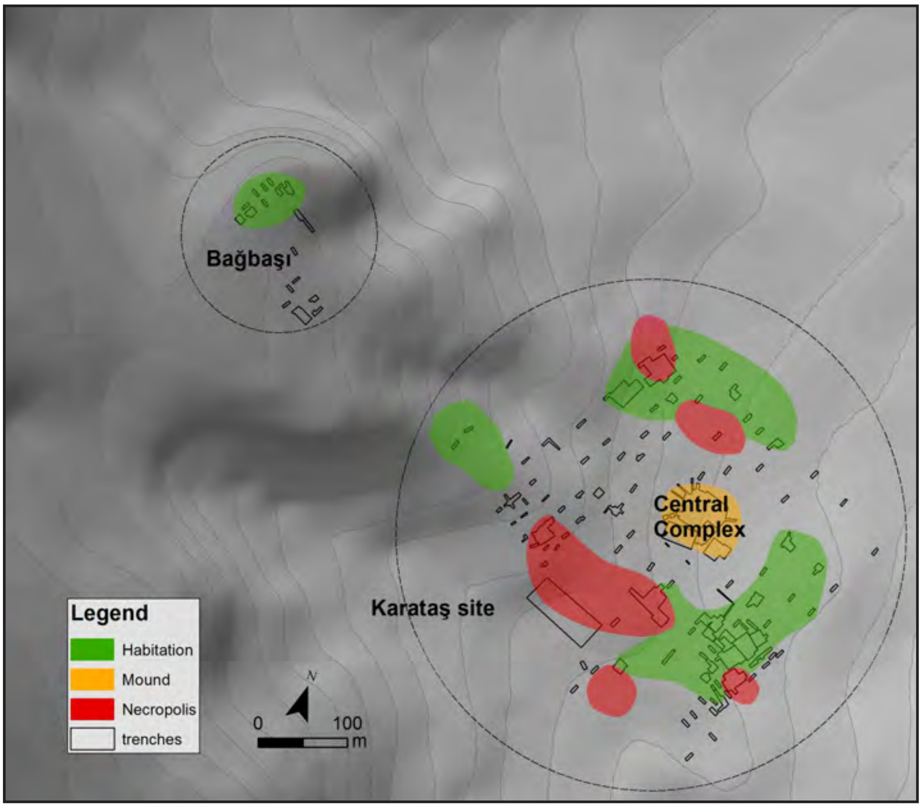


Figure 4.13 Plan of the site of Elmalı-Karataş.

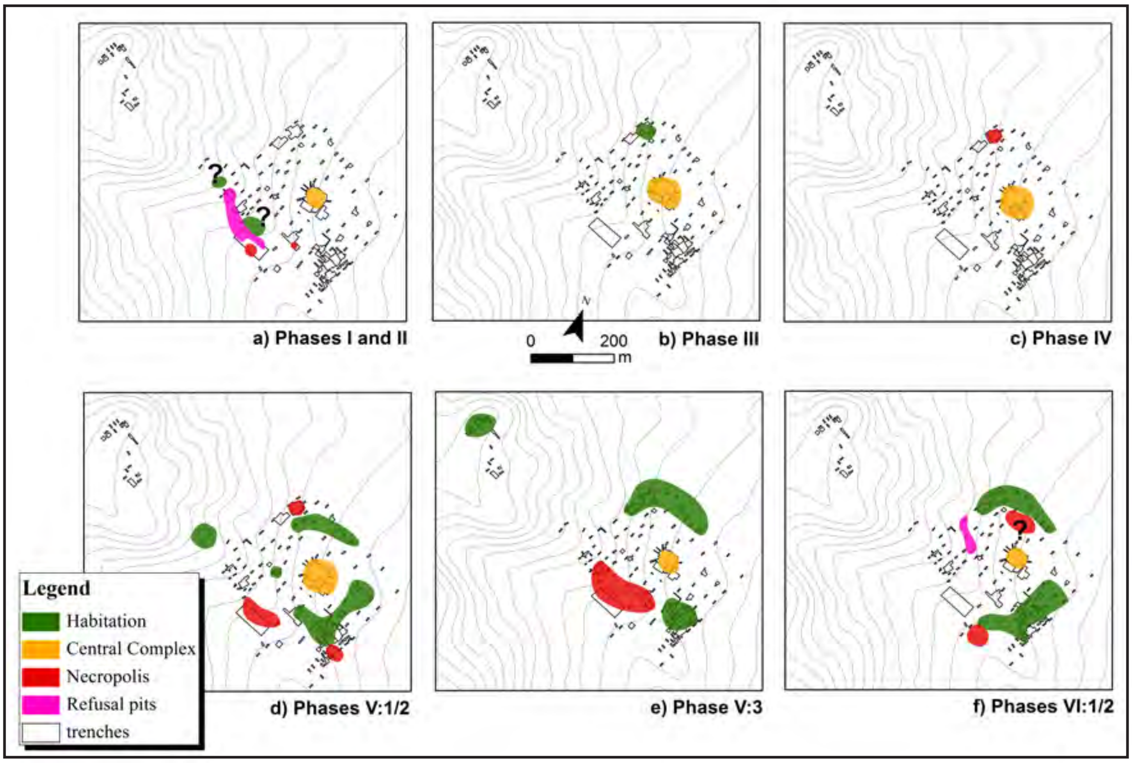


Figure 4.14 Composite map showing the diachronic changes in the location of residential and cemeterial areas in different phases of Elmalı-Karataş.

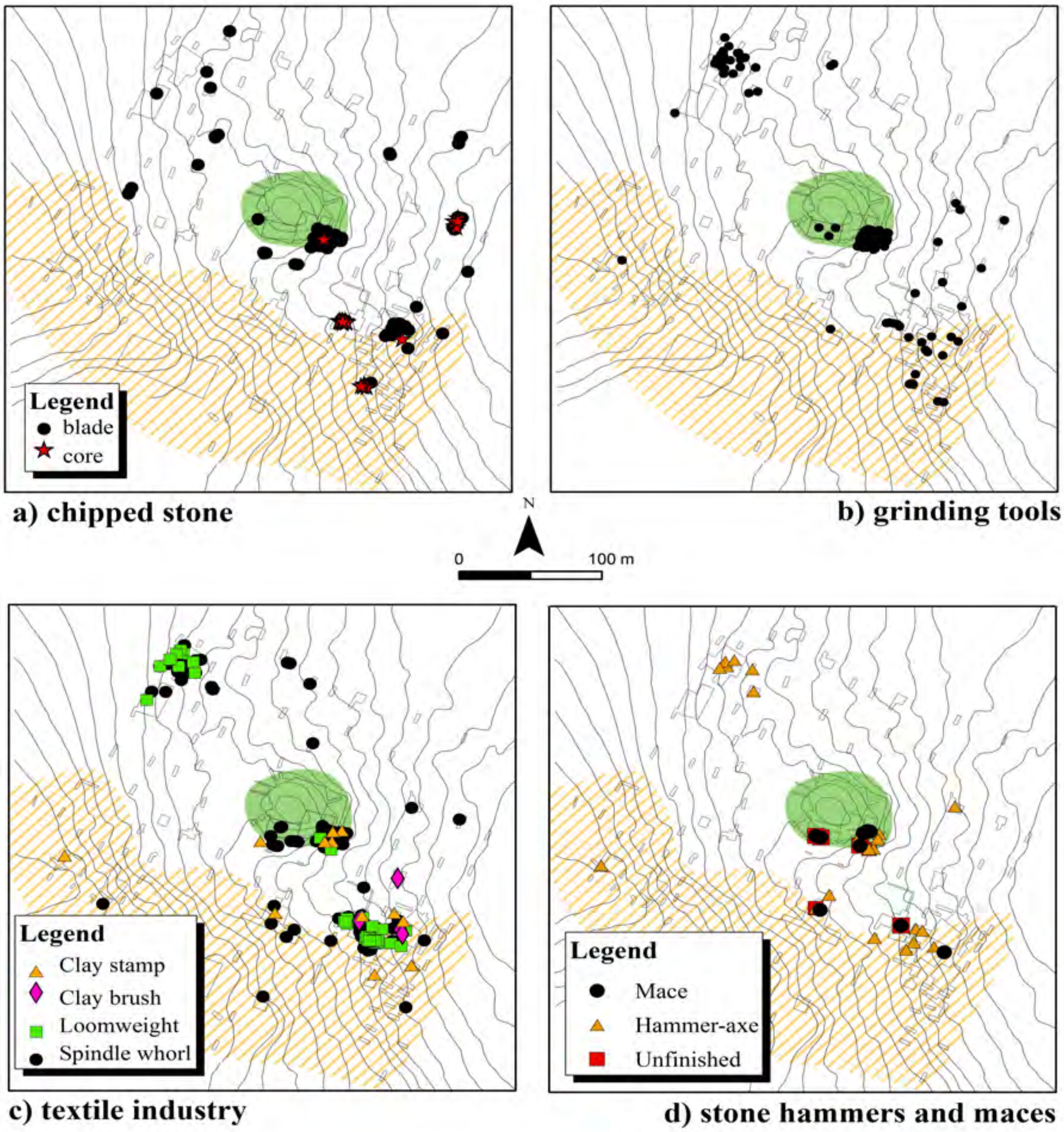


Figure 4.15 Distribution maps of different tools in Karataş phases V and VI. Green area indicates the location of the "Central Complex", while orange hatching indicates an area with highly eroded soil, thus less likely to yield comparable amounts of objects.

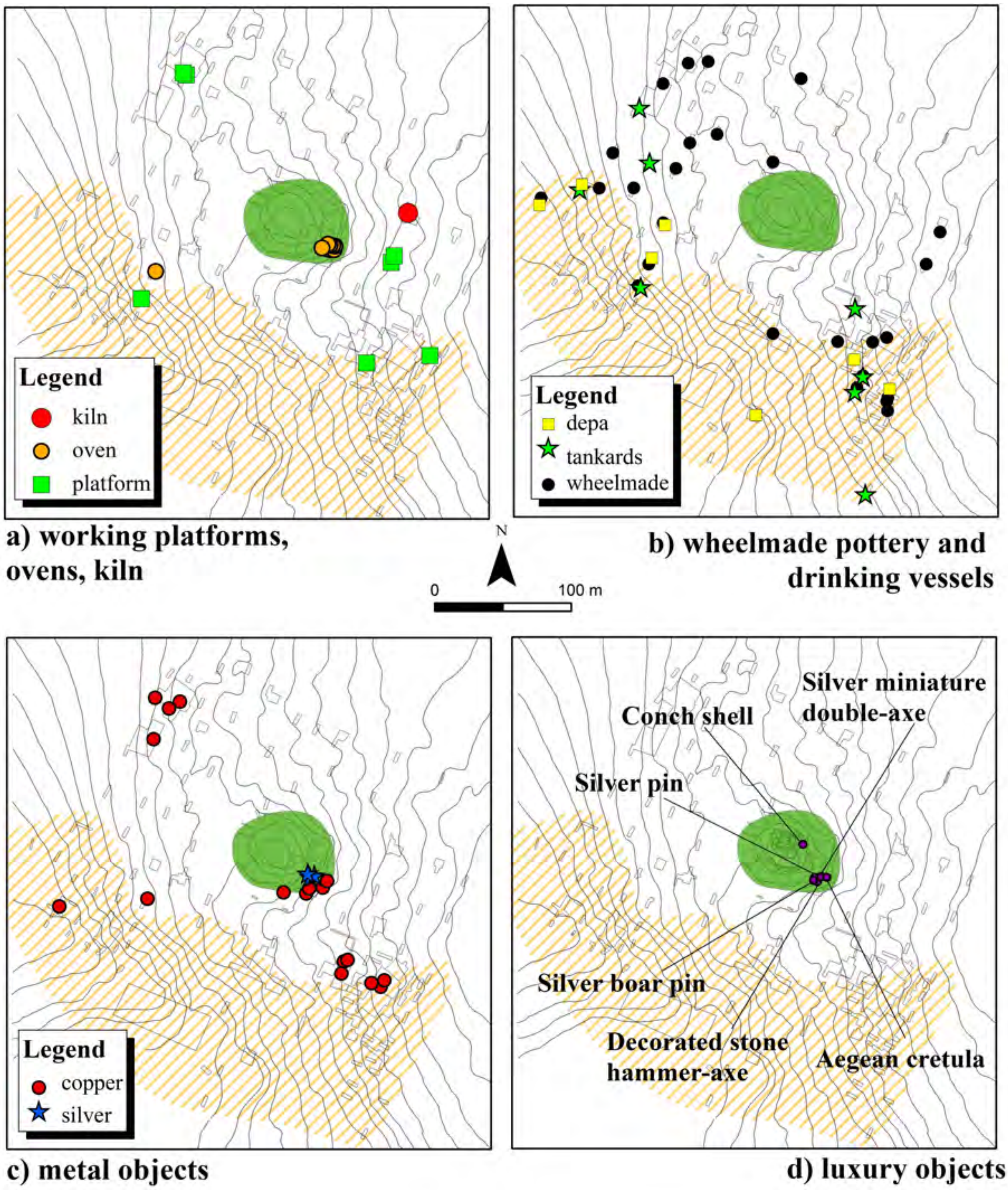


Figure 4.16 Distribution maps of different architectural installations and objects mainly from Karataş phases V and VI (with exclusion of some copper objects in map c and the conch shell in map d). Green area indicates the location of the "Central Complex", while orange hatching indicates an area with highly eroded soil, thus less likely to yield comparable amounts of objects.

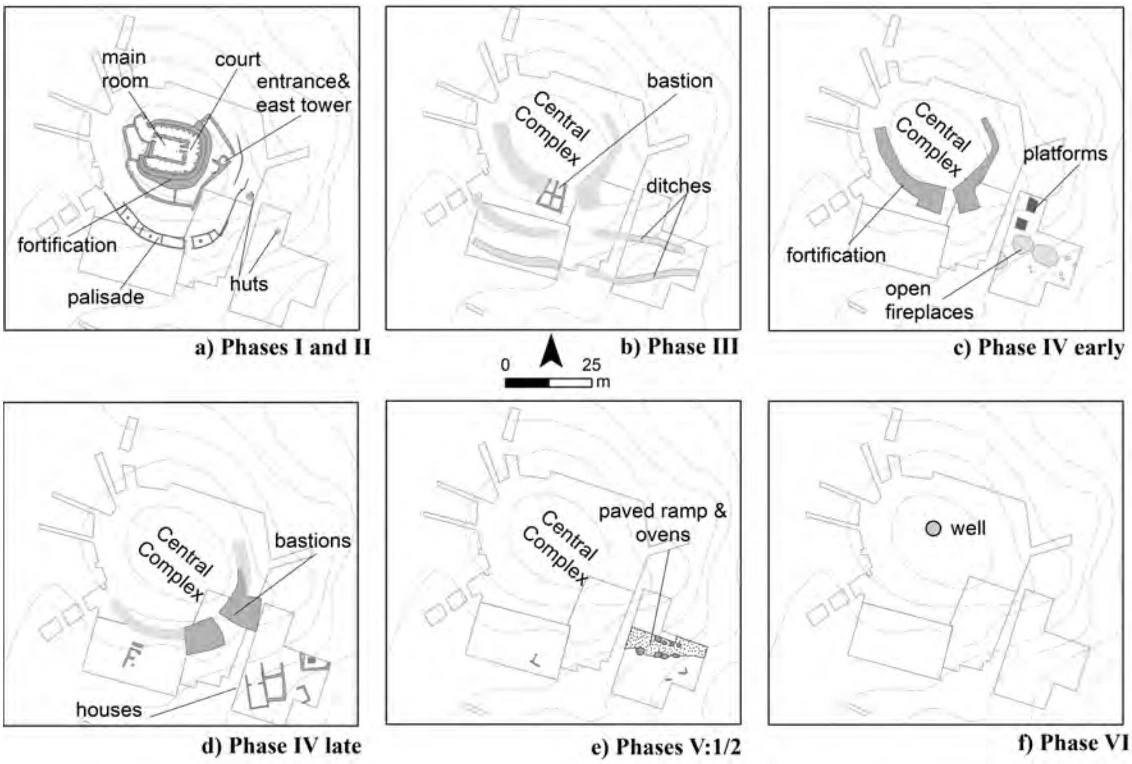


Figure 4.17 Plan of Karataş' "Central Complex" in the six recognizable phases of occupation.

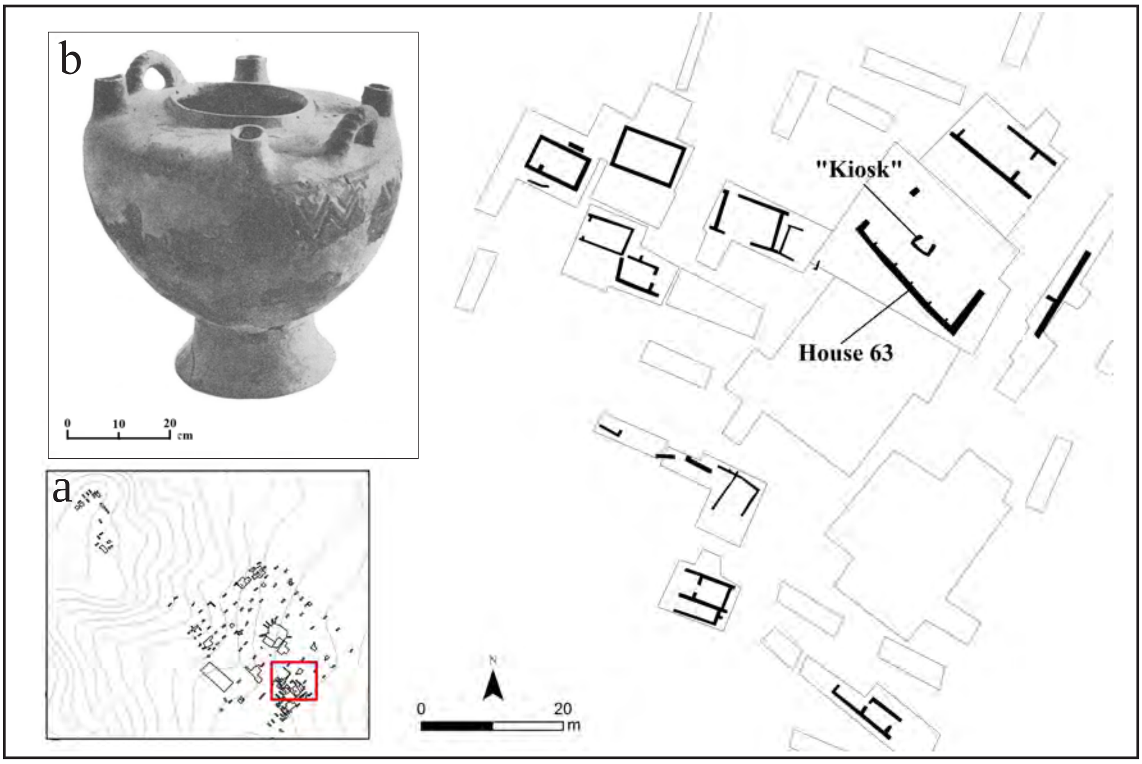


Figure 4.18 Plan of House 63 and "Kiosk" within the contemporary buildings of period V:3 and VI. Inset a) shows the location of House 63 within the site, b) crater found in the "kiosk" (after Mellink 1969a:plate I.1).

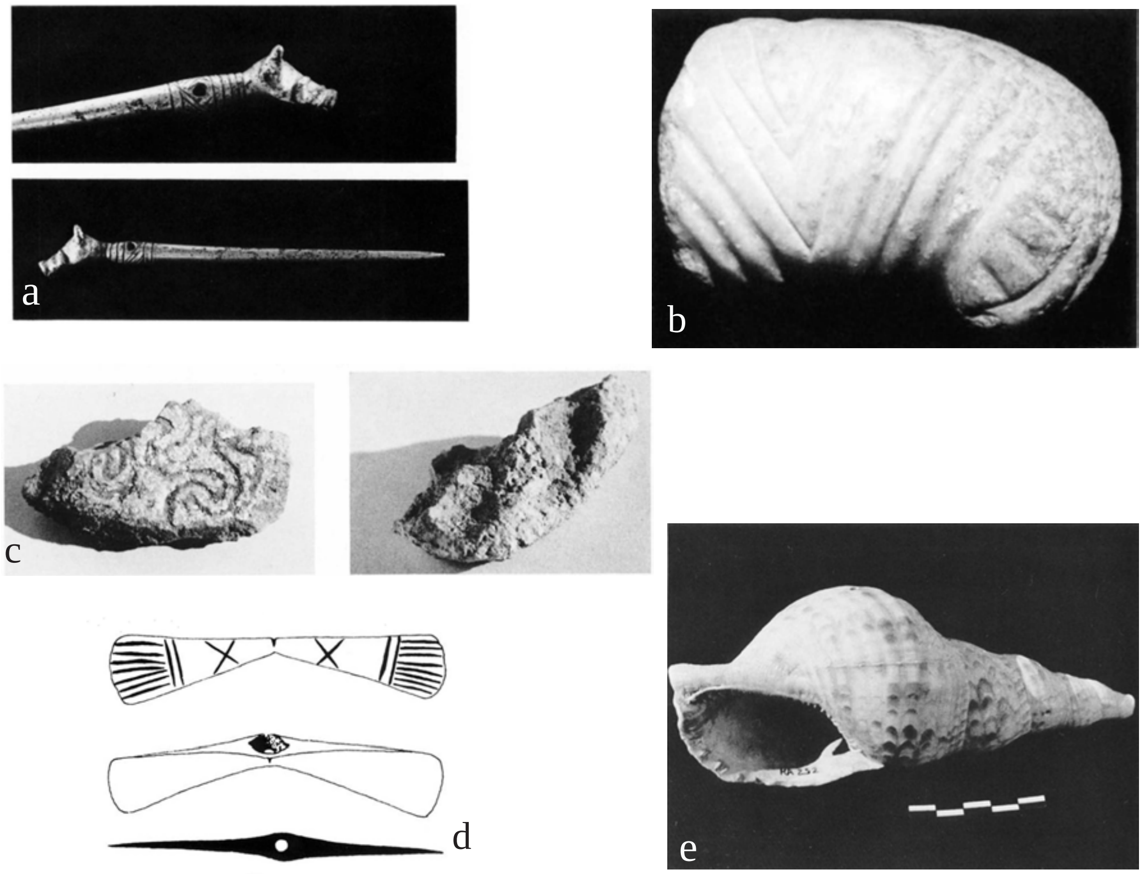


Figure 4.19 Luxury items from the mound area (”Central Complex”): a) silver boar-headed pin (Mellink 1970:fig.16), b) grooved white limestone hammer-axe (Mellink 1971:fig.4), c) western Aegean (?) seal impression (Mellink 1972:fig.5), d) miniature silver double-axe (Mellink 1967:fig.50), e) Shell of *Charonia variegata* (Mellink 1966:fig.25). Images not to scale.

Trench	*Phase*	*No. burials*	*No. burials %*	*Graves w/metal %*	*Gold items*	*Gold items %*	*Silver items*	*Silver items %*	*Copper items*	*Copper items %*
tr.98	V:2/3	115	26.8	24	24	96	74	85.1	63	40.4
tr.7/12	V:2/3	51	11.9	23	1	4	10	11.5	47	30.1
tr.125	VI	9	2.1	22	0	0	0	0	2	1.3
SE Cemetery	V:1/2	56	13.1	16	0	0	2	2.3	15	9.6
Main Cemetery	V:1/3	137	31.9	15	0	0	1	1.1	25	16
tr.35/37	IV-V:1	61	14.2	6	0	0	0	0	4	2.6
tot		429			25		87		156	

Figure 4.20 Table showing the concentration of metal objects in different cemetery areas (for trench location refer to figure 4.21). Information about the approximate chronological span of the burial ground in each area is given, together with the total number of retrieved graves (after Alpers-Bordaz 1978:tables III-V).

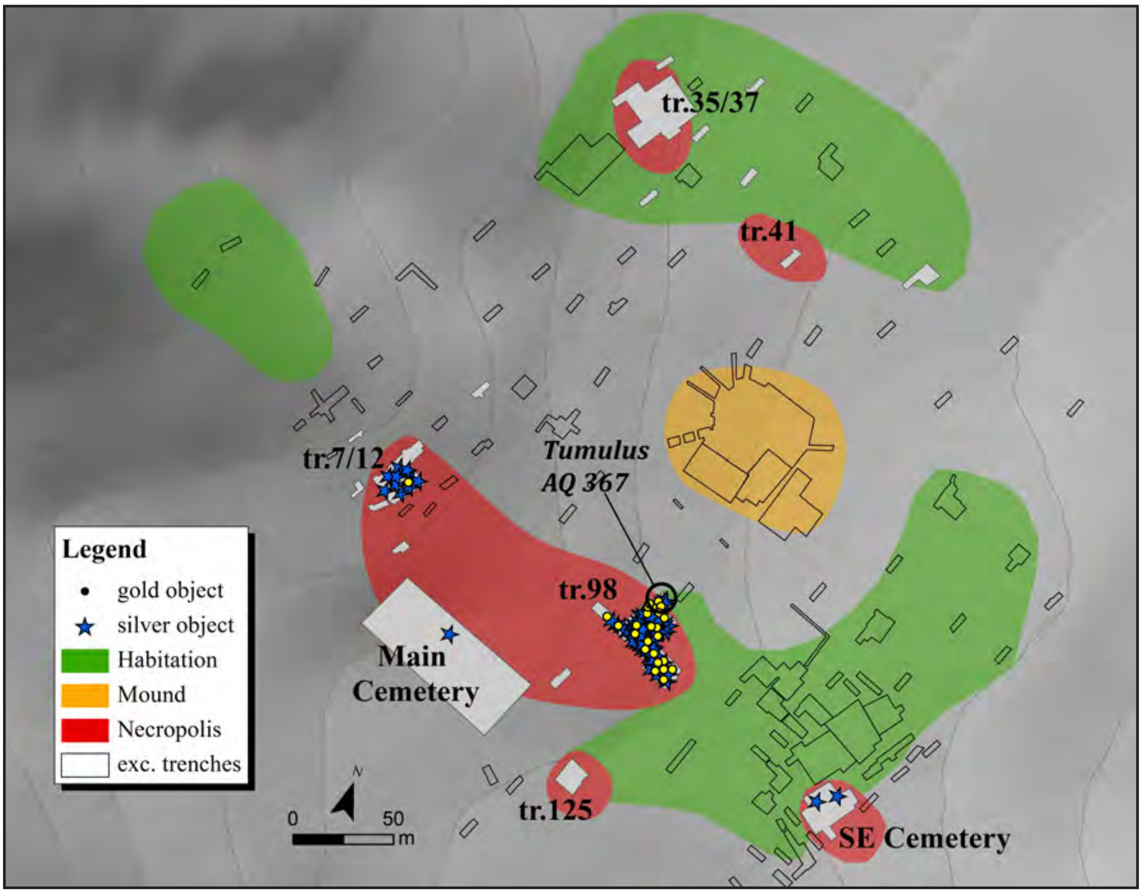


Figure 4.21 Map showing the distribution of silver and gold items in the different cemetery areas (data from Alpers-Bordaz 1978:tables III-V). The "chiefly grave" tumulus AQ367 is also marked.

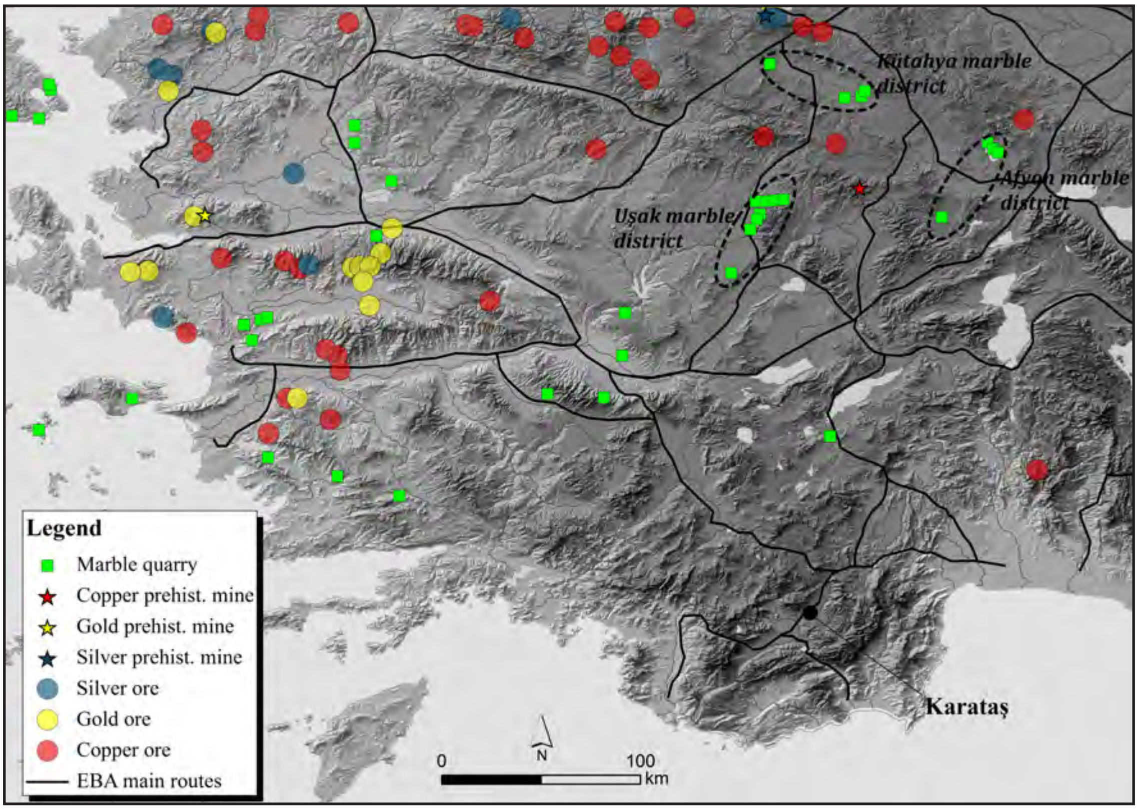


Figure 4.22 Map showing the location of mineral deposits, marble deposits and prehistoric metal mines in south-western Anatolia.

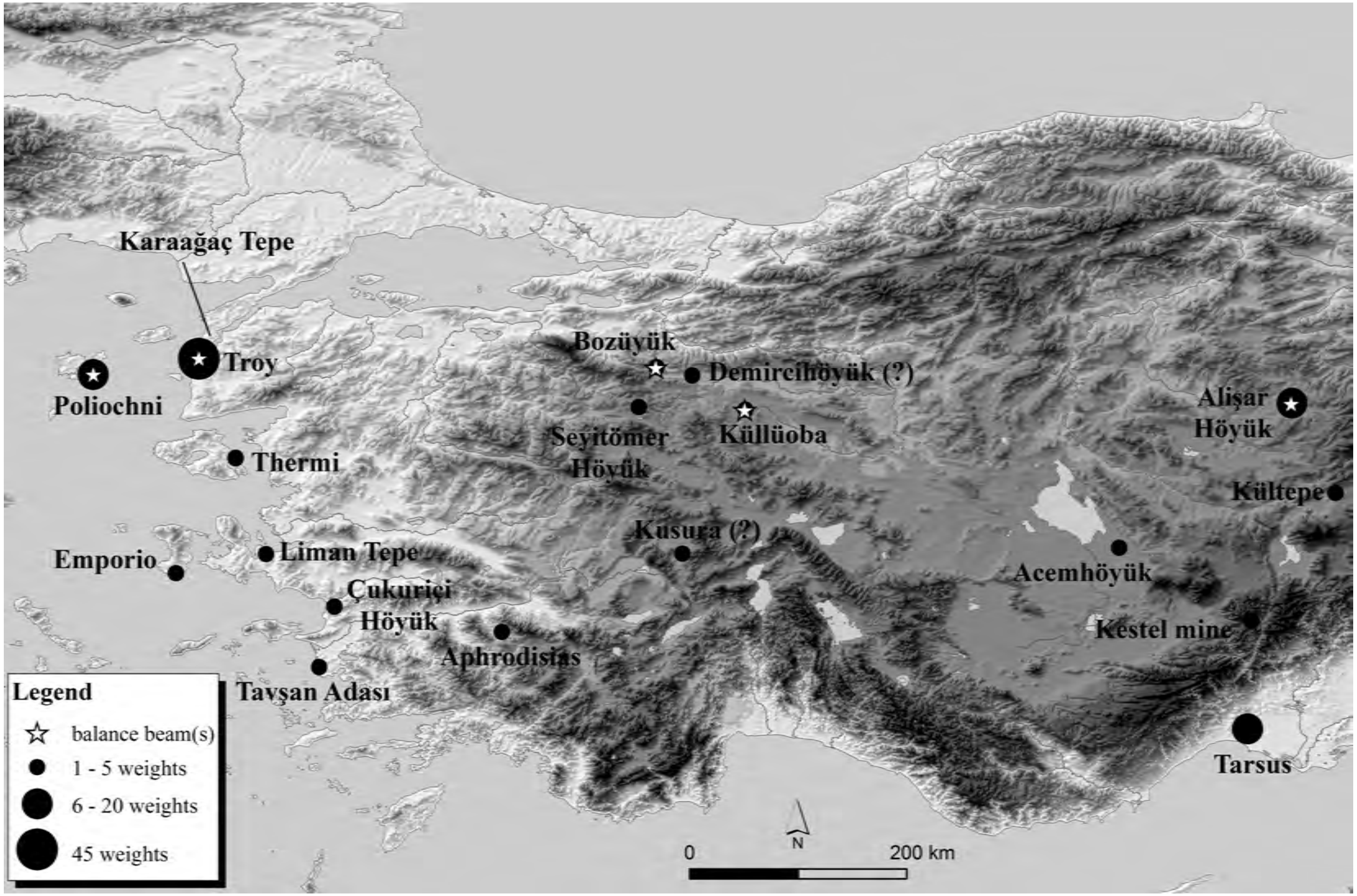


Figure 5.1 Map showing the occurrence of balance weights and balance beams in EBA Anatolia (bigger symbol size represents a larger number of weights).

Site	*Site size*	*Archaeological level*	*Date*	*Context description*	*Context class.*	*Weight type*	*Material*	*No. weights*	*Comments*	*References*
Çukuriçi Höyük	2ha	levelling activity between phases IV and III	2900-2750 cal BC	all three weights were in the soil accumulated over phase IV to create a stable terrace for the phase III buildings	metal workshop	sphendonoid	dark basalt	3	several radiocarbon dates for phases IV, III and levelling activity: 2900-2750 cal BC	Horejs 2009, Barbara Horejs pers.comm.
Tarsus	12ha	EB I levels	2800-2700 BC	unknown	unknown	sphendonoid	hematite	1		Goldman 1956:267, 275, fig.420
Alişar Höyük	18ha	levels 11-7M	2600-2100 BC	unknown	unknown	sphendonoid	hematite	19+	only three were accessed by Rahmstorf	von der Osten 1937a: 190, 269, figs.192, 271; Rahmstorf 2009:204
Tarsus	12ha	early EB III levels: room 74	2400-2300 BC	room 74, at the edge of the mound, apparently a non-public context, had a small hoard of 47 faience beads, pottery and copper-alloy pins and earrings, together with a small piece of iron. The 11 weights were found on the floor	elite building?	sphendonoid	hematite	7	the contents of the hoard suggest a wealthy house, and the 11 weights were clearly found together, suggesting perhaps a merchant's house. Other 6 in other contexts	Goldman 1956:32-33, 267, fig.420
Troy	10ha	Troy IIg: rooms 207 and 253	2300-2200 cal BC	within the citadel, south of the earlier monumental megara. Both rooms only partially excavated, adjacent rooms have caches of gold jewellery and gold/copper finds	elite buildings	sphendonoid	hematite and diorite	2(45)	43 sphenondoid weights were further retrieved in Schliemann's excavations	Blegen et al.1950:359, 366-369; Bobokhyan 2009:23
Poliochni	8ha	Yellow: isolato IX, largo 104, spazio 1020, megaron 605, strada 102	2300-2200 BC	The settlement is burnt in this phase. piazza 104, street 102 and megaron 605 are the core of Poliochni Giallo settlement, with megaron 605 being the richest complex on site: Mesopotamian seal, gold hoard, Aegean imports. Spazio 1020 looks domestic context, not many metal finds. also more marginal position.	elite/metal workshop/ domestic buildings	sphendonoid	hematite	7		Bernabo'-Brea 1976:304-305
Aphrodisias	12-15ha	Acr.tr.3 complex 2	2200-1950 BC	room 2	domestic	sphendonoid	unknown	1		Sharp-Joukowsky 1986:fig.449,2
Küllüoba	5ha	late EB III levels	2200-1950 BC	courtyard of the citadel complex, possibly within votive pits?	elite	sphendonoid	hematite	1		Murat Türkteki pers.comm.
Acemhöyük	30ha+	level IV	2080-1970 cal BC	unknown	unknown	sphendonoid	hematite	1		Öztan 2012:303-304
Bozüyük	2ha	unknown	late EBA	unknown	unknown	sphendonoid	hematite	1		Koerte 1899:17, table IV.9
Kestel	-	mine shaft no.2	late EBA	pithouse	tin mine	sphendonoid	hematite	1		Yener 2000:96
Karaağaç Tepe	1ha	level I	early EBA	unknown	unknown	sphendonoid		1		Demangel 1926:28, fig.31.12

Figure 5.2 Summary table of published sphendonoid weight finds in western and central EBA Anatolia, in chronological order.

Site	*Site size*	*Archaeological level*	*Date*	*Context description*	*Context class.*	*Weight type*	*Material*	*No. weights*	*Comments*	*References*
Poliochni	8ha	Blue: northern dump area and megaron 832	2910-2670 cal BC	megaron 832 in all phases show traces of a metallurgical workshop. In the Blue Archaic phase there is a tuyere, a copper slag, imported Aegean pot, with 2 spool weights. The other four come from dump area.	elite/metal workshop	spool	Marble	5	Megaron 832, phase Ble Archaic is dated by charred fig sample to 2910-2673 BC in the same context as the weight (Begemann et alii 1992, 220).	Bernabo'-Brea 1964:98-112
Çukuriçi Höyük	2ha	levelling activity between phases IV and III	2900-2750 cal BC		metal workshop	spool	-	1	several radiocarbon dates for phases IV, III and levelling activity: 2900-2750 cal BC	Barbara Horejs pers.comm.
Demircihöyük	0.3ha	stray	2850-2800 cal BC	unknown	unknown	spool	marble	1	probably not a spool weight but a pestle	Baykal-Seeher 1996:173, pl.72.14
Tarsus	12ha	early EB II levels: room 114 late EB II levels: street south of room 114	2700-2600 BC 2500-2400 BC	room 114 is at the outskirts of the settlement, with a loom, two hearths, a pebble area and large platform, possibly second floor. Described as a workshop, but not supported by architectural features or finds.	workshop?/domestic	spool	Marble/ Limestone	4		Goldman 1956:12-16, 275; Rahmstorf 2009:202
Emporio	2ha	phase II early, area F trench B/12, stage 2	2600-2500 BC	long house with apse	unknown	spool	shell	1	context only excavated for a small area	Hood 1982:675, pl.142.57
Thermi	2ha	Phase IV, area E	2600-2500 BC	context not specified, but within the area that yielded metallurgical tools and slags throughout the settlement phases	metal workshop?	spool	marble	1		Lamb 1936:195, pl.23.30-56
Poliochni	8ha	Red: Quartiere Ovest and Isolato VII	2600-2400 BC	contex unknown	unknown	spool	Marble	3	described as made by very fine craftsmanship	Bernabo'-Brea 1964:674
Poliochni	8ha	Red: vano 828	2600-2400 BC	the room belong s to the larger complex of megaron 832, associated with metallurgical production. In adjacent room 829 found a large hoard of copper-alloy weapons, in room 828 there is a tuyere and some copper items	workshop/elite	spool	Lead	1		Bernabo'-Brea 1964:354, pl.177.29
Troy	10ha	Troy IIg: room 115	2300-2200 cal BC	nearby room has a loom with over 200 gold beads possibly sewn into a fabric	elite buildings	spool	Marble	1	no similar specimens are listed in Schliemann's publications	Blegen et al.1950:321-363
Poliochni	8ha	Yellow: room 633, strada 102, strada 105, room 412	2300-2200 BC	rooms 633 and 412 belong to larger buildings of domestic character, while the findings in streets 102 and 105 are adjacent to the large elite building megaron 605, and occur together with large amounts of copper-alloy, silver and lead items, and a Cycladic marble basin	elite/metal workshop	spool	Marble/ Limestone	3		Bernabo'-Brea 1976, 304-305
Kusura	10ha	transtional phase B-C	2100-1950 BC	unknown	unknown	spool	Red stone	1		Lamb 1938:269, fig.26.4
Liman Tepe	20ha	unknown	unknown	unknown	unknown	spool	Red stone	1		Vasıf Şahoğlu pers.comm.
Tavşan Adası	1ha?	unknown	unknown	unknown	unknown	spool	unknown	1	only briefly mentioned	Rahmstorf 2009:201

Figure 5.3 Summary table of published spool weight finds in western and central EBA Anatolia, in chronological order.

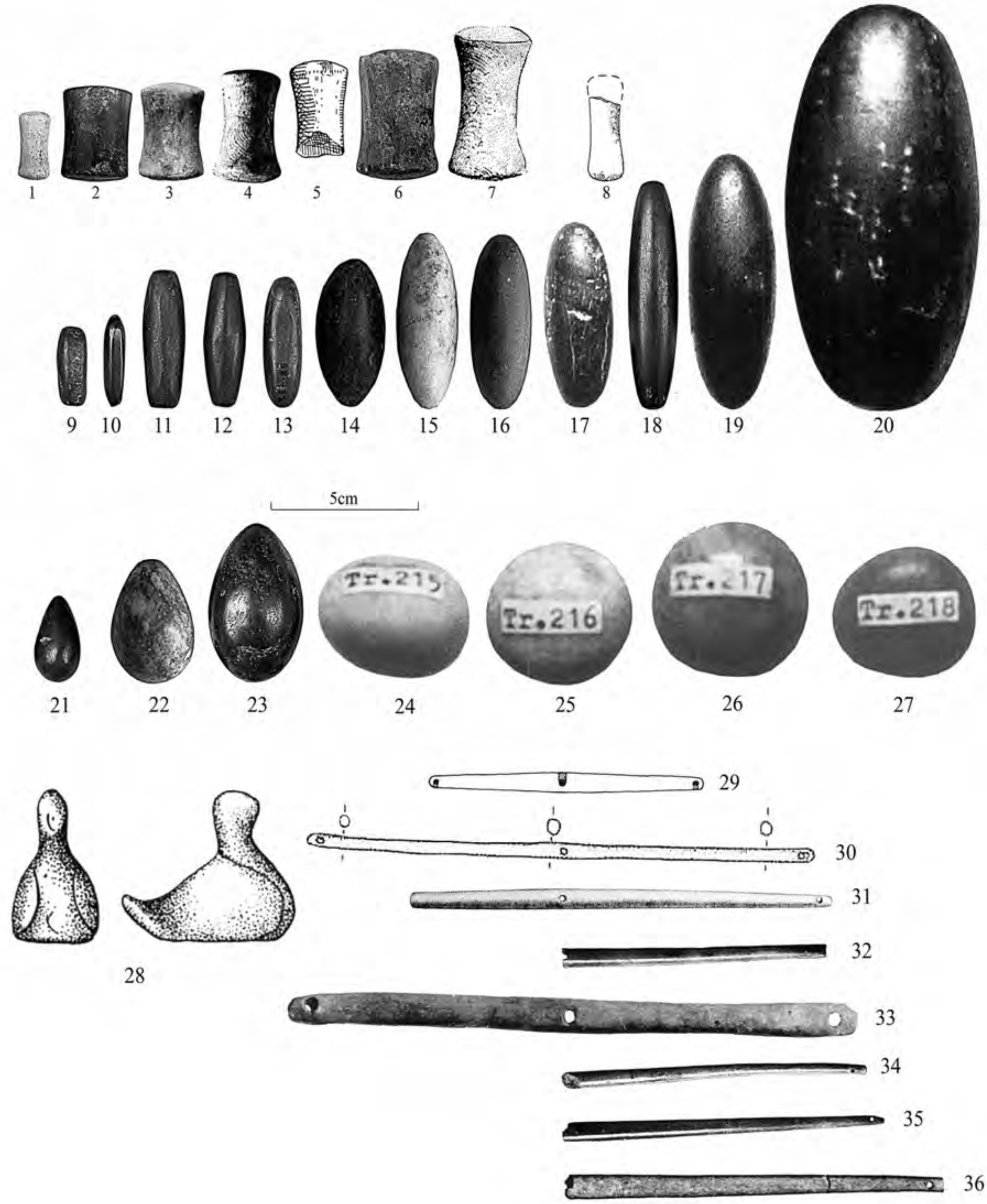


Figure 5.4 Selected EBA Anatolian metrology tools, to the same scale: spools weights (1-8), sphendonoid weights (9-20), drop-shaped weights (21-23), spherical weights (24-27), duck-shaped weight (28), and bone scale beams (29-36). From Tarsus EB II levels (1, 2, 6: Rahmstorf 2009:fig.1), Tarsus EB III levels (9-13, 19, 21, 23: Rahmstorf 2009:fig.2), Poliochni level Blue (3: Bernabo-Brea 1964:pl.103.14), Troy II-V levels (4, 17, 18, 20, 24-27: Bobokhyan 2009:figs. 5-6), Troy III (28: Bobokhyan 2009:fig.11), Troy I late (29: Blegen et al.1950:174-175, fig.222), Troy IIg (36: Blegen et al.1950:fig.365), Kusura B-C transitional phase (5: Lamb 1938:pl.26.4), Thermi IV (7: Lamb 1936:pl.23.30-56), Demircihöyük stray find (8: Baykal-Seeher 1996:pl.72.14), Alişar Höyük levels 11-7M (14-16, 22: Rahmstorf 2009:fig.3), Alişar Höyük "Copper Age" levels (32, 34, 35: Schmidt 1932:fig.84.b989-b427-b988), Küllüoba “EB III” levels (30: Efe 2007:fig.16), Bozüyük (31: Koerte 1899:fig.IV.10), Poliochni Red (33: Bernabo-Brea 1964:pl.178.9).

Site name	Stratigraphy	Date	Context	Total	Reference
Troy	I late	c.2600-2400 BC	"citadel"	1	Blegen et al.1950:174-175, fig.222
Troy	IIg	c.2400-2200 BC	"citadel"	1	Blegen et al.1950:324, fig.365
Poliochni	Red	c.2600-2400 BC	unknown (from sounding under room 504)	1	Bernabo' Brea 1964:515, pl.178.9
Küllüoba	"mid-EBA"	c.2600-2400 BC	unknown	1	Efe 2007:58, fig.16
Bozüyük		late EBA	unknown	1	Koerte 1899:21, fig.IV.10
Alişar Höyük	"Copper Age"	c.2800-2200 BC	unknown	5	Schmidt 1932:70, figs.84.b989-b260-b427-b988; von der Osten 1937a:193, fig.194.e472

Figure 5.5 Summary table of known scale beams found in western and central EBA Anatolia.

OID	Site	Type	Stratigraphy	Period	Weight (gr)	Basic unit	Multiple/ fraction	Deviation (in gr)	Deviation (in %)	Reference
1	Alişar Höyük	sphendonoid	level 9M	2400-2200 BC	49.9	8.5	6	1.1	2.2	Rahmstorf 2009:204
2	Alişar Höyük	sphendonoid	levels 6-5M	2200-1950 BC	34.2	8.5	4	0.2	0.6	Rahmstorf 2009:204
3	Alişar Höyük	sphendonoid	levels 6-5M	2200-1950 BC	34.25	8.5	4	0.25	0.7	Rahmstorf 2009:204
4	Poliochni	sphendonoid	Yellow	2400-2200 BC	4.82	9.4	1/2	0.24	5.0	Bernabo'-Brea 1976:304-305
5	Poliochni	sphendonoid	Yellow	2400-2200 BC	45.3	7.8	6	1.3	2.9	Bernabo'-Brea 1976:304-305
6	Poliochni	sphendonoid	Yellow	2400-2200 BC	17.32	8.5	2	0.3	1.7	Bernabo'-Brea 1976:304-305
7	Poliochni	sphendonoid	Yellow	2400-2200 BC	14.9	7.8	2	0.7	4.7	Bernabo'-Brea 1976:304-305
8	Poliochni	sphendonoid	Yellow	2400-2200 BC	28.44	9.4	3	0.08	0.3	Bernabo'-Brea 1976:304-305
9	Poliochni	sphendonoid	Yellow	2400-2200 BC	76.1	9.4	8	0.9	1.2	Bernabo'-Brea 1976:304-305
10	Küllüoba	sphendonoid	late EB III pit	2100-1950 BC	84	8.5	10	1	1.2	Murat Türkteki pers.comm.
11	Çukuriçi Höyük	sphendonoid	levelling layer CH III-IV	2900-2750 cal BC	15.67	7.8	2	0.07	0.4	Horejs 2009:365
12	Tarsus	sphendonoid	EB I levels	2800-2700 BC	10.2	?				Goldman 1956:275
13	Tarsus	spool	EB II levels, room 114	2600-2500 BC	27.8	9.4	3	0.4	1.4	Rahmstorf 2009:202
14	Tarsus	spool	EB II levels, room 114	2600-2500 BC	46.9	7.8	6	0.5	1.1	Rahmstorf 2009:202
15	Tarsus	spool	EB II levels, room 114	2600-2500 BC	4.5	8.5	1/2	0.2	4.4	Rahmstorf 2009:202
16	Tarsus	spool	EB II levels, room 114	2600-2500 BC	79.5	7.8	10	1.5	1.9	Rahmstorf 2009:202
17	Tarsus	spherical	EB II levels, room 117	2600-2500 BC	79.4	7.8	10	1.4	1.8	Rahmstorf 2009.203
18	Tarsus	ovoid	EB III levels, room 74	2400-2100 BC	4.4	8.5	1/2	0.3	6.8	Goldman 1956:267, 121
19	Tarsus	ovoid	EB III levels, room 74	2400-2100 BC	16.6	8.5	2	0.4	2.4	Goldman 1956:267
20	Tarsus	ovoid	EB III levels, room 74	2400-2100 BC	32.5	8.5	4	1.5	4.6	Goldman 1956:267
21	Tarsus	ovoid	EB III levels, room 74	2400-2100 BC	100	8.5	12	2	2.0	Goldman 1956:267
22	Tarsus	ovoid	EB III levels, room 53	2400-2100 BC	44.8	11.7	4	2	4.5	Goldman 1956:275
23	Tarsus	sphendonoid	EB III levels, room 74	2400-2100 BC	6.5	9.4	2/3	0.2	3.1	Goldman 1956:267
24	Tarsus	sphendonoid	EB III levels, room 74	2400-2100 BC	8	7.8	1	0.2	2.5	Goldman 1956:267
25	Tarsus	sphendonoid	EB III levels, room 74	2400-2100 BC	20.5	?			0.0	Goldman 1956:267
26	Tarsus	sphendonoid	EB III levels, room 74	2400-2100 BC	48.5	9.4	5	1.5	3.1	Goldman 1956:267
27	Tarsus	sphendonoid	EB III levels, room 74	2400-2100 BC	5.2	7.8	2/3	0	0.0	Goldman 1956:267
28	Tarsus	sphendonoid	EB III levels, room 74	2400-2100 BC	18.5	9.4	2	0.3	1.6	Goldman 1956:267
29	Tarsus	sphendonoid	EB III levels, room 74	2400-2100 BC	22.5	7.8	3	0.9	4.0	Goldman 1956:267
30	Troy	sphendonoid	level IIg	2300-2200 cal BC	5.2	7.8	2/3	0	0.0	Rahmstorf 2009:205

Figure 5.6 Table of measured EBA Anatolian balance weights, with suggested units of measure to which they belong and deviations thereof, that might suggest either small manufacturing errors or (especially for higher values) their affiliation to other, presently unknown, unit systems.

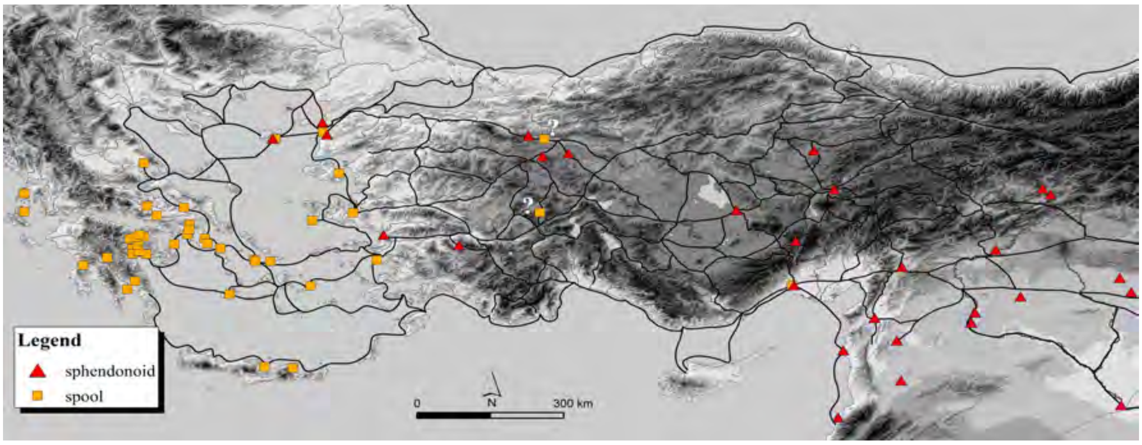


Figure 5.7 Distribution of EBA spool and sphendonoid weights between the Aegean and Mesopotamia (data from Rahmstorf 2006b, with addition of EBA Anatolian sites presented in figs. 5.2 and 5.3). In the background the path of main EBA sea and land routes is also marked (cf. chapter 3).

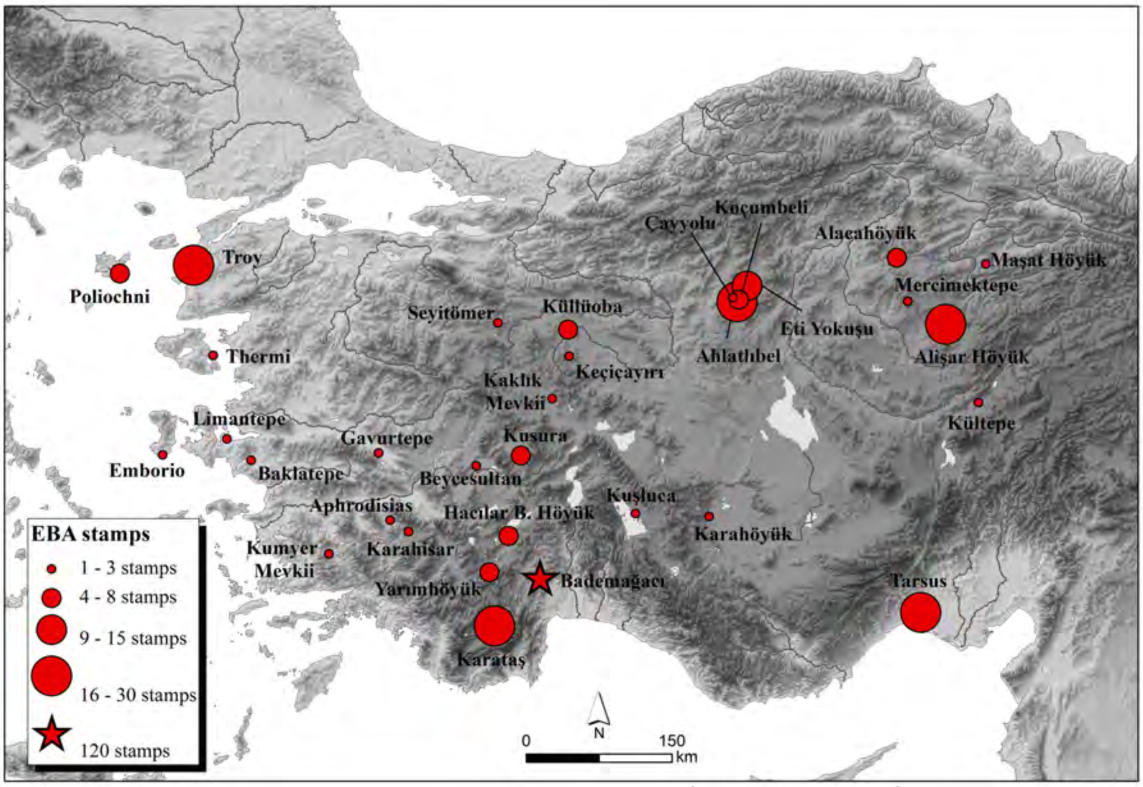


Figure 5.8 Anatolian sites yielding EBA stamps; symbol size reflects the number of stamps at each location (cf. figure 5.11 for details and references).

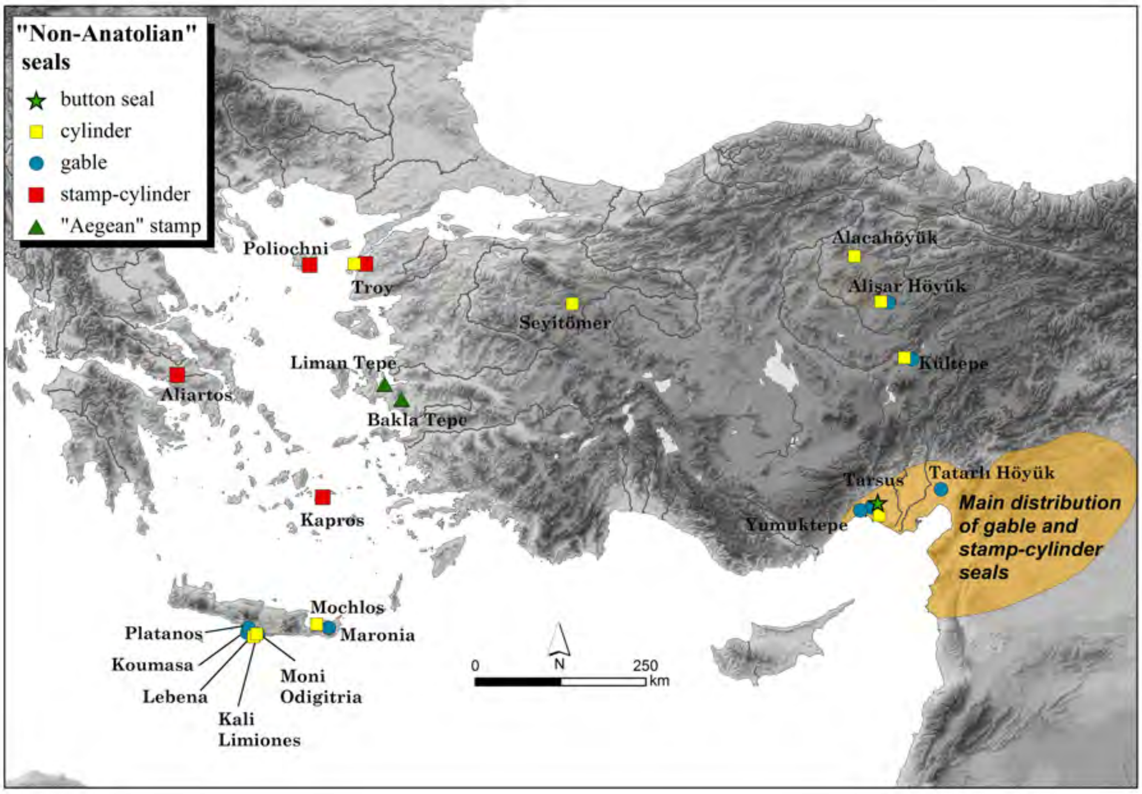


Figure 5.9 Anatolian and Aegean sites yielding EBA cylinder seals, stamp-cylinder seals, gable seals and button seal (cf. figure 5.13 for details and references). Data on the Aegean corpus are taken from the online ARACHNE database.

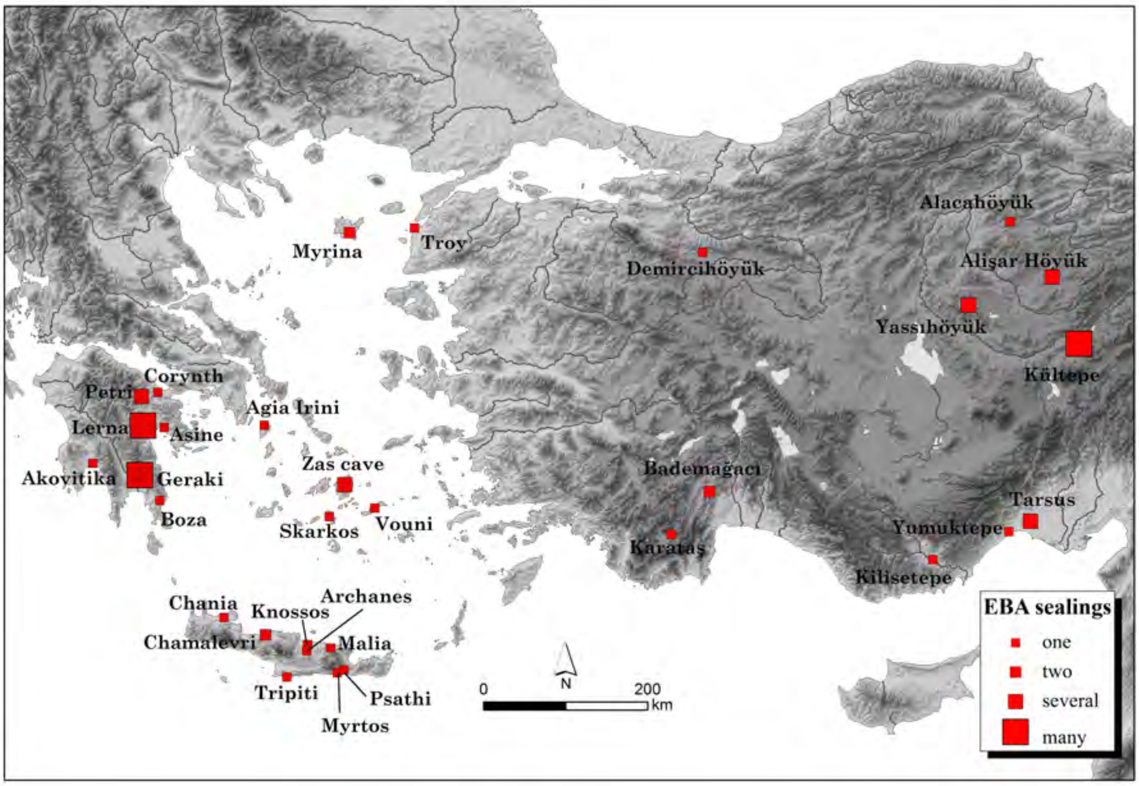


Figure 5.10 Anatolian and Aegean sites yielding EBA sealings; symbol size reflects the number of sealings at each location (cf. figure 5.14 for details and references). Data regarding the Aegean corpus are taken from Aruz 2008; Pullen 1994; Schoep 2006; Webb and Weingarten 2012; Weingarten et al.2011.

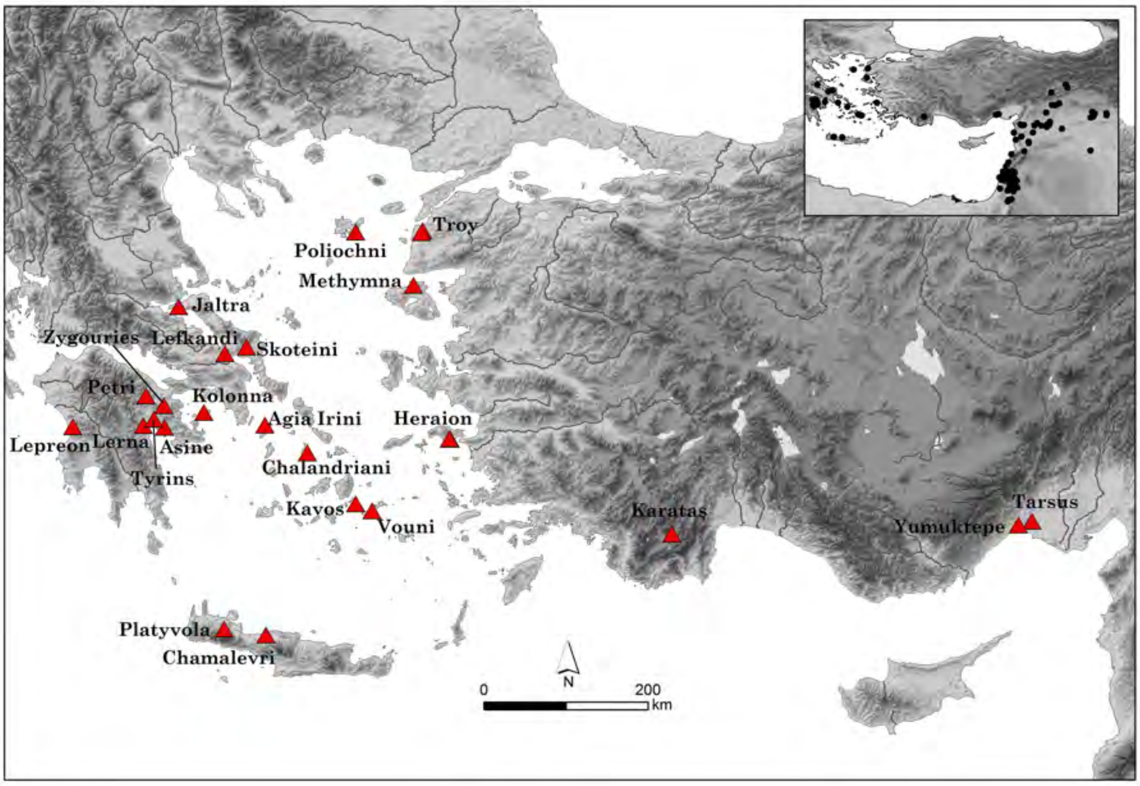


Figure 5.11 Anatolian and Aegean sites yielding EBA seal-impressed pottery; the inset shows the distribution of seal-impressed pottery from the Aegean to Upper Mesopotamia and the Levant (cf. figure 5.15 for details and references). Data on the Aegean corpus are taken from Aruz 2008; the online ARACHNE database. Data on the Levantine/Mesopotamian corpus are taken from Rahmstorf 2006b.

Cat. no	Site	Dating	Material	Shape	Handle	Surface Size(mm)	Face shape	Motif class	Motif type	Motif subtype	Reference
St001	Beycesultan	2900-2700 BC	stone	stalk handle	w/hole	20x18	rectangular	Geometric-angular	squares		Lloyd and Mellaart 1962:29, 272, 275, fig.4.8
St002	Hacılar B. Höyük	2900-2700 BC	stone	loop handled	w/hole	24x22	rectangular	Geometric-angular	circle-and-angle		Umurtak 2013:51, fig.6
St003	Hacılar B. Höyük	2900-2700 BC	clay	stalk handle	w/hole	40x40	rectangular	Abstract	symbols		Umurtak 2013:51, fig.5
St004	Kaklık Mevkii	2900-2700 BC	clay	conoid	wt/hole	Ø 19	circular	Geometric-angular	central line + perpendicular		Efe et al.1995:390, fig.27.107
St005	Karataş	2900-2700 BC	clay	conoid	w/hole	Ø 18	circular	Geometric-angular	hatched cross		Mellink 1965:250, cat.no.KA117, pl.64-fig. 33a-b
St006	Karataş	2900-2700 BC	clay	conoid	w/hole	20x20	rectangular	Geometric-angular	angle-filled cross	oblique	Mellink 1965:250, cat.no. KA131, pl.64-fig.33a-b
St007	Karataş	2900-2700 BC	clay	N/A	w/hole	Ø 32	lobate	Geometric-curvilinear	rosette		Mellink 1972:259, cat.no. KA830, pl.55-fig.4c
St008	Karataş	2900-2700 BC	clay	stalk handle	w/hole	Ø 27	circular	Abstract	strokes		Warner 1994:15-16, cat.no. KA684, pl.186.a
St009	Karataş (Bagbaşi)	2900-2700 BC	clay	stalk handle	wt/hole	Ø 36	circular	Abstract	strokes		Eslick 1992:36-37, cat.no. KA582, pls.59.273, 106e-f.273
St010	Küllüoba	2900-2700 BC	clay	foot-shaped	w/hole	23	footprint	Geometric-angular	footprint		Öner 2009:81-82, cat.no. 138, pl.23a
St011	Karataş	2800-2600 BC	clay	gabled	w/hole	20x20	circular	Geometric-angular	hatched cross		Mellink 1967:264, cat.no. KA393, pl.84-fig.54a
St012	Karataş	2800-2600 BC	clay	tronco-conoid	w/hole	h. 29	rectangular	Geometric-angular	angle-filled cross	vertical	Mellink 1967:264, cat.no. KA372, pl.84-fig.55a-b
St013	Karataş	2800-2600 BC	clay	N/A	N/A	Ø 22	circular	Geometric-angular	angle-filled cross	curvilinear	Mellink 1967:264, cat.no. KA399, pl.84-fig.56
St014	Karataş	2800-2600 BC	clay	N/A	N/A	Ø 28	circular	Geometric-angular	angle-filled cross	curvilinear	Mellink 1967:264, cat.no. KA398, pl.84-fig.58
St015	Karataş	2800-2600 BC	clay	N/A	N/A	Ø 31	circular	Geometric-angular	angle-filled cross	curvilinear	Mellink 1967:264, cat.no. KA418, pl.84-fig.59
St016	Karataş	2800-2600 BC	clay	N/A	broken	20x13	rectangular	Geometric-angular	angle-filled cross	oblique	Mellink 1965:250, cat.no.KA128, fig.33.a-b
St017	Karataş	2800-2600 BC	clay	gabled	w/hole	Ø 36	circular	Geometric-angular	angle-filled cross	curvilinear	Mellink 1965:250, pl.65-fig.37a-b
St018	Karataş	2800-2600 BC	clay	N/A	N/A	Ø 25	circular	Abstract	symbols		Mellink 1970:250, cat.no. KA741, pl.58-fig.23b
St019	Karataş	2800-2600 BC	clay	N/A	N/A	Ø 19	circular	Abstract	symbols		Mellink 1972:259, cat.no. KA821, pl.55-fig.4a
St020	Karataş	2800-2600 BC	stone	gabled	w/hole	20x9	oval	Geometric-angular	grid	simple	Warner 1994:111-123, cat.no. KA755, pl.187a
St021	Karataş	2800-2600 BC	clay	tronco-conoid	w/hole	Ø 25	circular	Abstract	symbols		Warner 1994:111-123, cat.no. KA741, pl.187b
St022	Karataş	2800-2600 BC	clay	conoid	w/hole	Ø 15	circular	N/A			Warner 1994:111-123, cat.no. KA828, pl.187c
St023	Karataş	2800-2600 BC	clay	conoid	w/hole	30x21	oval	Abstract	fingerprint		Warner 1994:111-123, cat.no. KA836, pl.186d
St024	Karataş	2800-2600 BC	clay	conoid	w/hole	Ø 23	circular	Geometric-angular	central circle+radial lines		Warner 1994:125, cat.no. KA681, pl.186e
St025	Karataş	2800-2600 BC	clay	conoid	w/hole	Ø 21	circular	Geometric-angular	hatched cross		Warner 1994:96-97, cat.no. KA500, pl.186f
St026	Karataş	2800-2600 BC	clay	N/A	N/A	Ø 21	circular	Geometric-angular	angle-filled cross	curvilinear	Mellink 1970:250, cat.no. KA725, pl.58-fig.23a
St027	Küllüoba	2800-2600 BC	clay	conoid	broken	Ø 54	circular	Abstract	fingerprint		Öner 2009:81-82, cat.no. 135, pl.22d
St028	Küllüoba	2800-2600 BC	clay	conoid	wt/hole	Ø 30	star	Abstract	strokes		Öner 2009:81-82, cat.no. 137, pl.22f
St029	Kusura	2800-2600 BC	clay	N/A	broken	Ø 38	circular	Abstract	symbols		Lamb 1938:252, fig.18.1
St030	Kusura	2800-2600 BC	clay	stalk handle	w/hole	35x35	rectangular	Abstract	symbols		Lamb 1938:252, fig.18.3
St031	Poliochni	2800-2600 BC	shell	pyramidal	w/hole	24x22	rectangular	Geometric-angular	central circle+radial lines		Bernabò Brea 1964:157, pl. 86g; CMS IS 067
St032	Poliochni	2800-2600 BC	clay	conoid	w/hole	Ø 38	circular	Geometric-angular	angle-filled cross	vertical	Bernabò Brea 1964:232, pl. 168.9; CMS V 518
St033	Poliochni	2800-2600 BC	stone	pyramidal	w/hole	28x23	rectangular	Geometric-angular	grid	simple	Cultraro and Dova 2004:333; CMS VS3 211
St034	Poliochni	2800-2600 BC	clay	N/A	w/hole	Ø 19	circular	Abstract	fingernails		Bernabò Brea 1964:410, pl. 170.5; CMS IS 068
St035	Aphrodisias	2600-2400 BC	clay	stalk handle	w/hole	34x21	irregular	Abstract	symbols		Sharp-Joukowsky 1986:610, cat.no. 334.1, figs.318.4, 437.19, 440.22
St036	Beycesultan	2600-2400 BC	stone	stalk handle	w/hole	15x15	rhomboidal	Geometric-angular	squares		Lloyd and Mellaart 1962:57; 272, 275, fig.4.7
St037	Karataş	2600-2400 BC	lead	loop handled	broken	Ø 25	circular	Geometric-angular	grid	diagonal lattice	Warner 1994:99-103, cat.no.B97, pl.186g
St038	Küllüoba	2600-2400 BC	clay	N/A	w/hole	Ø 28	circular	Geometric-angular	simple cross		Öner 2009:81-82, cat.no. 132, pl.22a
St039	Küllüoba	2600-2400 BC	clay	gabled	w/hole	Ø 28	circular	Geometric-angular	simple cross		Öner 2009:81-82, cat.no. 133, pl.22b
St040	Küllüoba	2600-2400 BC	clay	N/A	broken	Ø 36	circular	Abstract	symbols		Öner 2009:81-82, cat.no. 134, pl.22c

Figure 5.12 Summary table of EBA Anatolian stamps from western/central Anatolia and Cilicia.

St041	Mikro Vouni	2600-2400 BC	clay	conoid	w/hole	Ø 32	circular	Geometric-angular	angle-filled cross	vertical	CMS VS3 339
St042	Poliochni	2600-2400 BC	clay	ring-conoid	w/hole	Ø 29	circular	Geometric-angular	central circle+radial lines		Bernabò Brea 1964:350, pl. 170.6; CMS IS 069
St043	Poliochni	2600-2400 BC	Cu-alloy	ring-seal	ring	20x19	rectangular	Geometric-angular	angle-filled cross	vertical	Bernabò Brea 1964:376, pl. 170.4; CMS IS 065
St044	Hacılar B. Höyük	2800-2400 BC	clay	N/A	N/A	N/A	circular	Geometric-angular	hatched cross		Umurtak and Duru 2012:25, fig.7
St045	Hacılar B. Höyük	2800-2400 BC	clay	loop handled	w/hole	Ø 58	circular	Abstract	symbols		Umurtak 2013:51, fig.7
St046	Kusura	2800-2400 BC	clay	stalk handle	wt/hole	26x26	rhomboidal	Geometric-angular	angle-filled cross	oblique	Lamb 1937:30, fig.12.19
St047	Kusura	2800-2400 BC	bone	stalk handle	w/hole	17x14	rectangular	Geometric-angular	angle-filled cross	vertical	Lamb 1937:30, fig.12.20
St048	Kusura	2800-2400 BC	stone	stalk handle	w/hole	13x13	rectangular	Geometric-angular	grid	complex	Lamb 1938:268, fig.18.4
St049	Bademağacı	2800-2200 BC	clay	conoid	w/hole	Ø 15	circular	Geometric-angular	simple cross		Duru 2005:fig. 48.2
St050	Bademağacı	2800-2200 BC	clay	conoid	w/hole	Ø 20	circular	Geometric-angular	angle-filled cross	vertical	Duru 2005:fig. 48.1
St051	Bademağacı	2800-2200 BC	bone	truncated pyramidal	w/hole	13x10	rectangular	Geometric-angular	grid	simple	Duru 2005:fig.48.3
St052	Bademağacı	2800-2200 BC	clay	conoid	w/hole	Ø 23	circular	Geometric-angular	angle-filled cross	vertical	Duru 2000:fig. 8
St053	Bademağacı	2800-2200 BC	clay	stalk handle	w/hole	Ø 24	circular	Geometric-angular	angle-filled cross	vertical	Duru 2005:fig. 42.3
St054	Bademağacı	2800-2200 BC	clay	conoid	w/hole	Ø 18	circular	Geometric-angular	simple cross		Duru 2005:fig. 42.1
St055	Bademağacı	2800-2200 BC	clay	foot-shaped	w/hole	N/A	footprint	Geometric-angular	footprint		Duru and Umurtak 2011a:fig. 7
St056	Bademağacı	2800-2200 BC	stone	stalk handle	w/hole	22x20	rectangular	Geometric-angular	squares		Umurtak 2010:21, fig.2
St057	Bademağacı	2800-2200 BC	stone	N/A	N/A	18x18	rhomboidal	Geometric-angular	grid	complex	Duru and Umurtak 2011b:442, fig. 4
St058	Emporio	2800-2200 BC	clay	gabled	w/hole	Ø 35	circular	Abstract	strokes		Hood 1982:626, fig.283.6
St059	Karataş	2800-2200 BC	clay	N/A	N/A	Ø 15	circular	N/A			Mellink 1972:259, cat.no. KA828, pl.55-fig.4b
St060	Karataş	2800-2200 BC	stone	N/A	w/hole	20x13	rectangular	N/A			Mellink 1965:250, cat.no. KA129, pl.64-fig.33a-b
St061	Küllüoba	2800-2200 BC	clay	conoid	w/hole	Ø 24	circular	N/A			Öner 2009:81-2, cat.no. 136, pl.22e
St062	Kumyer Mevkii	2800-2200 BC	clay	gabled	w/hole	Ø 51	circular	Geometric-angular	angle-filled cross	vertical	Tırpan and Gider 2011:386, fig.16
St063	Kuşluca	2800-2200 BC	clay	N/A	N/A	N/A	circular	Geometric-angular	central line + perpendicular		Çokbanker 1974:34, fig.13a
St064	Kuşluca	2800-2200 BC	stone	N/A	N/A	N/A	rectangular	Geometric-angular	grid	complex	Çokbanker 1974:34, fig.13b
St065	Kuşluca	2800-2200 BC	clay	N/A	N/A	N/A	circular	N/A			Çokbanker 1974:34, fig.13c
St066	Aphrodisias	2400-2200 BC	clay	N/A	broken	Ø 58	circular	Abstract	symbols		Sharp-Joukowsky 1986:fig.446.19, 449.6
St067	Aphrodisias	2400-2200 BC	Cu-alloy	stalk handle	w/hole	Ø 20	circular	N/A			Sharp-Joukowsky 1986:13, cat.no.320.4, fig.446.40
St068	Bademağacı	2400-2200 BC	clay	N/A	w/hole	15x15	rectangular	Abstract	symbols		Umurtak 2013:51, fig.9
St069	Bakla Tepe	2400-2200 BC	bone	bird	w/hole	18x8	rectangular	Geometric-angular	grid	diagonal lattice	Şahoğlu and Sotirakopoulou 2011:cat.no.211
St070	Karataş	2400-2200 BC	clay	conoid	w/hole	Ø 54	circular	Geometric-angular	angle-filled cross	vertical	Warner 1994:85, cat.no. KA465, pl.186c
St071	Karataş	2400-2200 BC	clay	conoid	w/hole	Ø 28	circular	Abstract	symbols		Warner 1994:90, cat.no. KA 501, pl.186d
St072	Karataş	2400-2200 BC	clay	stalk handle	w/hole	Ø 28	circular	Geometric-angular	angle-filled cross	vertical	Warner 1994:86, cat.no. KA572, pl.186e
St073	Karataş	2400-2200 BC	clay	conoid	w/hole	Ø 17	circular	Geometric-angular	angle-filled cross	vertical	Warner 1994, 69-72. cat.no. KA420, pl. 186b
St074	Küllüoba	2400-2200 BC	stone	foot-shaped	w/hole	N/A	footprint	Geometric-angular	footprint		Efe 2007:58, fig.15a
St075	Limantepe	2400-2200 BC	stone	bell-shaped	w/hole	Ø 16	circular	Geometric-angular	grid	simple	Şahoğlu 2008:489; CMS VS3 457
St076	Seyitömer Höyük	2400-2200 BC	clay	N/A	broken?	Ø 42	circular	Geometric-angular	simple cross		Çakalgöz 2000:51, cat.no. 156. ol . 46. 156
St077	Troy	2400-2200 BC	clay	conoid	wt/hole	Ø 18	circular	Abstract	symbols		Schliemann 1881:462, fig.492
St078	Troy	2400-2200 BC	clay	N/A	broken	Ø 32	circular	Geometric-angular	simple cross		Schliemann 1881:462, fig.493
St079	Troy	2400-2200 BC	clay	N/A	N/A	Ø 24	circular	Geometric-angular	zigzag		Schliemann 1881:462, fig.494
St080	Troy	2400-2200 BC	clay	N/A	broken	Ø 24	circular	Geometric-curvilinear	spiral		Schliemann 1881:462, fig.495
St081	Troy	2400-2200 BC	clay	conoid	w/hole	Ø 29	circular	Abstract	symbols		Schliemann 1881:462, fig.496
St082	Troy	2400-2200 BC	clay	N/A	N/A	Ø 30	circular	N/A			Schliemann 1881:462, fig.498
St083	Aphrodisias	2400-1950 BC	clay	N/A	broken	Ø 37	circular	Abstract	symbols		Sharp-Joukowsky 1986:fig.420.13, 421.37

Figure 5.12 (continued) Summary table of EBA Anatolian stamps from western/central Anatolia and Cilicia.

St084	Karahisar Höyük	2400-1950 BC	clay	conoid	w/hole	Ø 33	circular	Geometric-angular	grid	simple	Yayalı and Akdeniz 2002:23, fig.84
St085	Küllüoba	2400-1950 BC	Cu-alloy	N/A	N/A	Ø 1 5	circular	N/A			Efe 2007:58, fig.15b
St086	Bademağacı	2200-1950 BC	lead	loop handled	w/hole	Ø 20	circular	Geometric-angular	angle-filled cross	vertical	Umurtak 2002:159, fig.1
St087	Troy	2200-1950 BC	clay	N/A	broken	Ø 29	circular	Geometric-angular	hatched cross		Schliemann 1881:626, fig.1212
St088	Troy	2200-1950 BC	clay	irregular	w/hole	Ø 18	circular	Abstract	symbols		Schliemann 1881:626, fig.1213
St089	Ayasuluk	EBA	clay	stalk handle	N/A	Ø 31	circular	Abstract	strokes		Büyükkolancı 2007:77, fig.6
St090	Kusura	EBA	clay	conoid	w/hole	30x30	rectangular	Abstract	symbols		Lamb 1937:30, fig.12.17
St091	Thermi	EBA	Cu-alloy	stalk handle	broken?	Ø 25	circular	Geometric-angular	cross and dots		Lamb 1936:172, cat.no.30-26, fig.50.30-26
St092	Troy	EBA	clay	conoid	w/hole	Ø 27	circular	Abstract	symbols		Schliemann 1874:5, pl.19.546
St093	Troy	EBA	clay	conoid	broken	Ø 24	circular	Geometric-angular	central circle+radial lines		Schliemann 1874:5, pl.19.547
St094	Troy	EBA	clay	tronco-conoid	w/hole	Ø 29	circular	Abstract	symbols		Schliemann 1874:5, pl.19.548
St095	Troy	EBA	clay	stalk handle	N/A	Ø 42	circular	Geometric-angular	angle-filled cross	vertical	Schliemann 1874:5, pl.19.550
St096	Troy	EBA	clay	hour-glass	w/hole	Ø 15	circular	Geometric-angular	central circle+radial lines		Schliemann 1874:5, pl.19.551
St097	Troy	EBA	clay	stalk handle	w/hole	Ø 21	circular	Geometric-angular	hatched cross		Schliemann 1874:5, pl.19.552
St098	Troy	EBA	clay	N/A	N/A	Ø 24	circular	Geometric-angular	zigzag		Schliemann 1874:5, pl.19.558
St099	Troy	EBA	clay	N/A	broken	Ø 27	circular	Geometric-angular	simple cross		Schliemann 1874:5, pl.19.559
St100	Troy	EBA	clay	hour-glass	N/A	Ø 36	circular	Abstract	symbols		Schliemann 1874:5, pl.19.561
St200	Alacahöyük	2100-1750 BC	stone	stalk handle	w/hole	N/A	rectangular	Geometric-angular	grid	diagonal lattice	Çınaroğlu and Çelik 2010:307, fig.66
St201	Alacahöyük	2800-2200 BC	clay	foot-shaped	broken	N/A	footprint	Geometric-angular	footprint		Koşay 1938:135, pl.106.Al107
St202	Alacahöyük	2800-1950 BC	stone	stalk handle	w/hole	15x15	rectangular	Geometric-angular	circle-and-angle		Koşay 1951:191, fig.80.Al/c3
St203	Alacahöyük	2800-2200 BC	clay	conoid	broken	Ø 21	circular	Geometric-angular	angle-filled cross	variant A	Koşay 1951:148, pl.108.Al/b187
St204	Alacahöyük	2800-2200 BC	stone	stalk handle	w/hole	21x21	rectangular	Geometric-angular	swastika		Koşay 1951:148, pl. 108.Al/b1876
St205	Alacahöyük	2800-2200 BC	clay	stalk handle	broken	Ø 30	circular	Geometric-angular	central circle+radial lines		Koşay 1951:148, fig.108.Al/d30
St206	Alişar Höyük	2800-2200 BC	Cu-alloy	stalk handle	w/hole	14x14	rectangular	Abstract	strokes		Schmidt 1932:57, fig.64.b294
St207	Alişar Höyük	2800-2200 BC	Cu-alloy	stalk handle	w/hole	9x10	rhomboidal	N/A			Schmidt 1932:57, fig.64.b583
St208	Alişar Höyük	2800-2200 BC	stone	stalk handle	w/hole	11x13	rectangular	Geometric-angular	crosses and lines		Schmidt 1932:57, fig.64.b853
St209	Alişar Höyük	2800-2200 BC	stone	stalk handle	w/hole	16x16	rectangular	Geometric-angular	angle-filled cross	oblique	Schmidt 1932:57, fig.64.b586
St210	Alişar Höyük	2800-2200 BC	Cu-alloy	stalk handle	w/hole	18x18	rectangular	Geometric-angular	angle-filled cross	oblique	Schmidt 1932:57, fig.64.b898
St211	Alişar Höyük	2700-2600 BC	clay	conoid	w/hole	Ø 20	circular	Geometric-angular	angle-filled cross	vertical	von der Osten 1937a:81-82, fig.87.c481
St212	Alişar Höyük	2700-2600 BC	Cu-alloy	loop handled	w/hole	Ø 28	circular	Geometric-angular	angle-filled cross	vertical	von der Osten 1937a:81-82, fig.87.c576
St213	Alişar Höyük	2800-2700 BC	Cu-alloy	stalk handle	w/hole	15x15	rectangular	Geometric-angular	angle-filled cross	oblique	von der Osten 1937a:81-82, fig.87.c1481
St214	Alişar Höyük	2800-2700 BC	stone	conoid	w/hole	Ø 19	circular	Geometric-angular	angle-filled cross	vertical	von der Osten 1937a:81-82, fig.87.e1909
St215	Alişar Höyük	2500-2300 BC	stone	stalk handle	w/hole	Ø 17	circular	Geometric-angular	grid	simple	von der Osten 1937a:183, fig.186.c307
St216	Alişar Höyük	2100-1950 BC	Cu-alloy	stalk handle	N/A	Ø 19	circular	Geometric-angular	angle-filled cross	vertical	von der Osten 1937a:183, fig.186.c740
St217	Alişar Höyük	2500-2300 BC	Cu-alloy	N/A	wt/hole	10x7	oval	Geometric-angular	grid	diagonal lattice	von der Osten 1937a:183, fig.186.d658
St218	Alişar Höyük	2100-1950 BC	stone	stalk handle	w/hole	14x13	rectangular	Geometric-angular	angle-filled cross	oblique	von der Osten 1937a:183, fig.186.d2385
St219	Alişar Höyük	1950-1750 BC	Cu-alloy	stalk handle	broken	Ø 27	circular	N/A			von der Osten 1937a:183, fig.186.d2861
St220	Alişar Höyük	2500-2300 BC	stone	stalk handle	w/hole	21x15	rectangular	Geometric-angular	angle-filled cross	oblique	von der Osten 1937a:183, fig.186.e119
St221	Alişar Höyük	2100-1950 BC	stone	stalk handle	w/hole	19x18	rectangular	Geometric-angular	angle-filled cross		von der Osten 1937a:183, fig.186.e394
St222	Alişar Höyük	2500-2300 BC	stone	stalk handle	w/hole	16x16	rectangular	Geometric-angular	angle-filled cross	oblique	von der Osten 1937a:183, fig.186.e456
St223	Alişar Höyük	2100-1950 BC	stone	stalk handle	w/hole	14x14	rectangular	Geometric-angular	crosses and lines		von der Osten 1937a:183, fig.186.e560
St224	Çayyolu Höyük	2600-2200 BC	clay	conoid	w/hole	20x20	rectangular	Geometric-angular	hatched cross		Arslan et al.2013:150, fig. 11.1
St225	Çayyolu Höyük	2800-2200 BC	stone	stalk handle	broken	15x14	rectangular	Geometric-angular	circle-and-angle		Arslan et al.2013:150, fig. 11.2

Figure 5.12 (continued) Summary table of EBA Anatolian stamps from western/central Anatolia and Cilicia.

St226	Eti Yokuşu	2800-2400 BC	clay	conoid	w/hole	Ø 23	circular	Geometric-angular	angle-filled cross	vertical	Kansu 1940:88, fig.80, cat. no.ev36 1
St227	Eti Yokuşu	2800-2400 BC	clay	tronco-conoid	broken	Ø 24	circular	Geometric-angular	angle-filled cross	vertical	Kansu 1940:88, fig.80, cat. no.ey379
St228	Eti Yokuşu	2800-2400 BC	clay	conoid	w/hole	Ø 34	circular	Geometric-curvilinear	wavy lines		Kansu 1940:87, fig.80, cat. no.ey294
St229	Eti Yokuşu	2800-2400 BC	clay	conoid	w/hole	Ø 26	circular	Geometric-angular	central line + perpendicular		Kansu 1940:87, fig.78, cat. no.ey359
St230	Eti Yokuşu	2800-2400 BC	stone	N/A	broken	22x25	rectangular	N/A			Kansu 1940:87, cat. no.ey293
St231	Eti Yokuşu	2800-2400 BC	clay	stalk handle	w/hole	26x27	rectangular	N/A			Kansu 1940:87-88, cat. no.ey2l2
St232	Eti Yokuşu	2800-2400 BC	clay	conoid	w/hole	Ø 18	circular	Geometric-angular	central circle + radial lines		Kansu 1940:86, fig.78, cat. no.ey162
St233	Eti Yokuşu	2800-2400 BC	clay	conoid	w/hole	Ø 23	circular	Geometric-curvilinear	waves from corners	circular	Kansu 1940:88, fig.78, cat. no.ey360
St234	Eti Yokuşu	2800-2400 BC	clay	conoid	w/hole	Ø 31	circular	Geometric-angular	angle-filled cross	oblique	Kansu 1940, 87. fig.78, cat. no.ey214
St235	Eti Yokuşu	2800-2400 BC	clay	conoid	w/hole	Ø 30	circular	Geometric-angular	angle-filled cross	vertical	Kansu 1940:87, fig.78, cat. no.ey215
St236	Eti Yokuşu	2800-2400 BC	clay	conoid	w/hole	Ø 24	circular	Geometric-angular	angle-filled cross	vertical	Kansu 1940:86, fig.78, cat. no.ey74
St237	Eti Yokuşu	2800-2400 BC	clay	conoid	w/hole	Ø 22	circular	Geometric-angular	angle-filled cross	vertical	Kansu 1940:86, fig.78, cat. no.eyl6l
St238	Koçumbeli	2800-2400 BC	clay	conoid	w/hole	N/A	circular	Geometric-curvilinear	circle-in-circle		Tezcan 1966:19, fig.35.1
St239	Koçumbeli	2800-2400 BC	clay	conoid	w/hole	N/A	circular	Geometric-curvilinear	waves from corners	circular	Tezcan 1966:19, fig.35.2
St240	Koçumbeli	2800-2400 BC	clay	conoid	w/hole	N/A	rectangular	Geometric-angular	hatched cross		Tezcan 1966:19, fig.35.3
St241	Koçumbeli	2800-2400 BC	clay	stalk handle	w/hole	N/A	rhomboidal	Geometric-curvilinear	waves from corners	rhomboidal	Tezcan 1966:19, fi.g.35.4
St242	Koçumbeli	2800-2400 BC	clay	conoid	w/hole	N/A	circular	Geometric-curvilinear	spiral		Tezcan 1966:19, fig.35.6
St243	Ahlatlıbel	2800-2400 BC	stone	stalk handle	w/hole	N/A	oval	Geometric-angular	angle-filled cross	oblique	Koşay 1934:69-71, cat.no.AB30
St244	Ahlatlıbel	2800-2400 BC	clay	stalk handle	w/hole	N/A	rhomboidal	Geometric-curvilinear	waves from corners	rhomboidal	Koşay 1934:69-71, cat. no.AB207
St245	Ahlatlıbel	2800-2400 BC	clay	conoid	w/hole	N/A	circular	Geometric-curvilinear	waves from corners	circular	Koşay 1934:69-71, cat.no.AB216
St246	Ahlatlıbel	2800-2400 BC	clay	N/A	broken	N/A	circular	Geometric-curvilinear	spiral		Koşay 1934:69-71, cat. no.AB21 7
St247	Ahlatlıbel	2800-2400 BC	clay	conoid	w/hole	N/A	irregular	Geometric-curvilinear	rosette		Koşay 1934:69-71, cat.no.AB250
St248	Ahlatlıbel	2800-2400 BC	clay	conoid	w/hole	N/A	circular	Geometric-angular	strokes		Koşay 1934:69-71, cat.no.AB233
St249	Ahlatlıbel	2800-2400 BC	clay	tronco-conoid	w/hole	N/A	rectangular	Geometric-angular	hatched cross		Koşay 1934:69-71, cat.no.AB439
St250	Ahlatlıbel	2800-2400 BC	clay	N/A	broken	N/A	rectangular	Geometric-curvilinear	rosette		Koşay 1934:69-71, cat.no.AB440
St251	Ahlatlıbel	2800-2400 BC	clay	stalk handle	w/hole	N/A	rhomboidal	Geometric-curvilinear	waves from corners	rhomboidal	Koşay 1934:69-71, cat.no.AB441
St252	Ahlatlıbel	2800-2400 BC	clay	tronco-conoid	w/hole	N/A	lobate	Geometric-curvilinear	star-shaped with central circle		Koşay 1934:69-71, cat.no.AB442
St253	Ahlatlıbel	2800-2400 BC	clay	N/A	broken	N/A	circular	Geometric-angular	simple cross		Koşay 1934:69-71, cat.no.AB457
St254	Ahlatlıbel	2800-2400 BC	clay	conoid	w/hole	N/A	circular	Geometric-angular	angle-filled cross	variant B	Koşay 1934:69-71, cat.no.AB496
St255	Ahlatlıbel	2800-2400 BC	clay	conoid	broken	N/A	lobate	Geometric-curvilinear	star-shaped with central circle		Koşay 1934:69-71, cat.no.206
St256	Ahlatlıbel	2800-2400 BC	clay	conoid	w/hole	N/A	circular	Geometric-angular	central circle + radial lines		Koşay 1934:69-71, cat.no.AB27
St257	Ahlatlıbel	2800-2400 BC	clay	conoid	broken	N/A	circular	N/A			Koşay 1934:69-71, cat.no.AB28
St258	Ahlatlıbel	2800-2400 BC	clay	tronco-conoid	w/hole	N/A	circular	Geometric-angular	central line + perpendicular		Koşay 1934:69-71, cat.no.AB29
St259	Ahlatlıbel	2800-2400 BC	clay	N/A	broken	N/A	circular	Geometric-angular	central line + perpendicular		Koşay 1934:69-7 1, cat.no.AB209
St260	Ahlatlıbel	2800-2400 BC	clay	conoid	w/hole	N/A	circular	Geometric-angular	central line + perpendicular		Koşay 1934:69-71, cat.no.Al210
St261	Ahlatlıbel	2800-2400 BC	clay	conoid	w/hole	N/A	circular	Geometric-angular	central line + perpendicular		Koşay 1934:69-71, cat.no.AB321
St262	Ahlatlıbel	2800-2400 BC	clay	conoid	broken	N/A	circular	Geometric-angular	strokes		Koşay 1934:69-71, cat.no.AB322
St263	Ahlatlıbel	2800-2400 BC	clay	conoid	broken	N/A	circular	Geometric-angular	central circle + radial lines		Koşay1934:69-71, cat.no.AB443
St264	Kültepe	2300-1950 BC	clay	gabled	w/hole	N/A	rectangular	Geometric-angular	squares		Ezer 2014
St265	Kültepe	2300-1950 BC	Cu-alloy	stalk handle	w/hole	N/A	rectangular	N/A			Ezer 2014
St266	Maşat Höyük	2300-1950 BC	clay	conoid	w/hole	Ø 21	circular	Geometric-angular	simple cross		Emre 1993:15, fig.61
St267	Mercimektepe	2300-1950 BC	clay	foot-shaped	w/hole	N/A	footprint	Geometric-angular	footorint		Yozgat museum
St268	Mercimektepe	2300-1950 BC	clay	N/A	w/hole	N/A	rectangular	Geometric-angular	hatched cross		Yozgat museum
St269	Konya-Karahöyük	2300-1950 BC	stone	foot-shaped	w/hole	27x10	footprint	Geometric-angular	footprint		Alp 1968:137, pl.15-35
St270	Tarsus	2600-2400 BC	bone	stalk handle	w/hole	Ø 10	circular	Geometric-curvilinear	rosette		Goldman 1956:237, fig.392.3, cat.no.47.110

Figure 5.12 (continued) Summary table of EBA Anatolian stamps from western/central Anatolia and Cilicia.

St271	Tarsus	2600-2400 BC	horn	stalk handle	w/hole	Ø 13	circular	Geometric-curvilinear	rosette		Goldman 1956:237, fig.392.4, cat.no.47.109
St272	Tarsus	2600-2400 BC	stone	stalk handle	wt/hole	Ø 13	circular	Geometric-angular	simple cross		Goldman 1956:237, fig.392.5. cat.no.38.1676
St273	Tarsus	2600-2400 BC	stone	stalk handle	wt/hole	20x15	oval	Geometric-angular	strokes		Goldman 1956:237, fig.392.6, cat.no.38.1434
St274	Tarsus	2600-2400 BC	stone	stalk handle	wt/hole	22x16	oval	Geometric-angular	angle-filled cross	vertical	Goldman 1956:237, fig.392.7, cat.no.38.1554
St275	Tarsus	2600-2400 BC	stone	stalk handle	broken	N/A	rectangular	N/A			Goldman 1956:237, fig.392.10, cat.no.38.1185
St276	Tarsus	2600-2400 BC	Cu-alloy	stalk handle	w/hole	N/A	two knobs	Geometric-angular	grid		Goldman 1956:237, fig.392.13, cat.no.47.87
St277	Tarsus	2600-2400 BC	Cu-alloy	stalk handle	w/hole	Ø 17	rosette	Geometric-curvilinear	rosette		Goldman 1956:237, fig.392.14,cat.no.47.1
St278	Tarsus	2600-2400 BC	Cu-alloy	stalk handle	w/hole	Ø 17	circular	Geometric-angular	angle-filled cross	variant C	Goldman 1956:237, fig.392.15, cat.no.38.1644
St279	Tarsus	2600-2400 BC	clay	conoid	w/hole	Ø 33	circular	Abstract	strokes		Goldman 1956:238, fig.392.16, cat.no.47.13
St280	Tarsus	2600-2400 BC	clay	conoid	broken	Ø 73	circular	Geometric-curvilinear	rosette		Goldman 1956:238. fig.392.17, cat.no.47.26
St281	Tarsus	2400-2200 BC	stone	tronco-conoid	w/hole	39x19	oval	Geometric-angular	grid	simple	Goldman 1956:238, fig.393.18, cat.no.38.713
St282	Tarsus	2400-2200 BC	stone	foot-shaped	w/hole	21x9	footprint	Geometric-angular	footprint		Goldman 1956:238, fig.393.19, cat.no.38.442
St283	Tarsus	2400-2200 BC	clay	N/A	w/hole	Ø 57	circular	Geometric-angular	central circle + radial lines		Goldman 1956:238, filg.393.22, cat.no.38.698
St284	Tarsus	2400-2200 BC	Cu-alloy	stalk handle	w/hole	Ø 18	circular	Figurative			Goldman 1956:238, fig.393.23, cat.no.38.854
St285	Tarsus	2100-1950 BC	Cu-alloy	stalk handle	w/hole	Ø 16	circular	N/A			Goldman 1956:238, fig.393.24, cat.no.36.898
St286	Tarsus	2100-1950 BC	clay	foot-shaped	w/hole	58x25	footprint	Geometric-angular	footprint		Goldman 1956:238, fi g.394.44, cat.no.37.231

Figure 5.12 (continued) Summary table of EBA Anatolian stamps from western/central Anatolia and Cilicia.

Cat. no.	Site	Dating	Material	Shape	Motif type	Size	Stratigraphy	Context	Reference
Cy001	Poliochni	2300-2200 BC	ivory	stamp-cy	Figurative	h. 49, Ø 18	level Giallo	megaron 605	Bernabò Brea 1976:298–300, pl.254; CMS IS 066
Cy002	Troy	2300-2200 BC	lapis lazuli	cylinder	Floreal	h. 33, Ø 12	"Third Burnt City"	"citadel"	Schliemann 1881:464, figs.502-503; Dörpfeld 1902:fig.447
Cy003	Troy	2300-2200 BC	clay	stamp-cy	Geometric	h. 57?, Ø 39?	"Third Burnt City"	"citadel"	Schliemann 1874:pl.19, no.555; Schliemann 1881:464, fig.499
Cy004	Troy	2300-2200 BC	clay	cylinder	Geometric	h. 57?, Ø 24?	"Third Burnt City"	"citadel"	Schliemann 1881:464, figs.500-501
Cy005	Troy	2200-2100 BC	bone	stamp-cy	Geometric	h. 43, Ø 19	Troy III	"citadel"	[from the ARCANE data-base]
Cy006	Troy	EBA	clay	stamp-cy	Geometric	h. 69?, Ø 45?	-	"citadel"	Schliemann 1874:pl.19, no.560
Cy007	Seyitömer Höyük	2200-1950 BC	faience	cylinder	Figurative	h. 18, Ø 12	V-A	"Palace"	Bilgen et al.2012:fig.8a
Cy008	Seyitömer Höyük	2200-1950 BC	faience	cylinder	Figurative	h. 21, Ø 14	V-A	"Palace"	Bilgen et al.2012:fig.8b
Cy100	Alacahöyük	unknown	red jasper	cylinder	Figurative	N/A	stray from surface		Bittel 1939-41:299-300, fig.3
Cy101	Alişar Hoyük	2300-2200 BC	diorite	cylinder	Geometric	h. 41, Ø 18	level 8M	"Citadel"	Bittel 1939-41:299, fig.2; von der Osten 1937a:183, fig.186, cat.no.e455
Cy102	Kültepe	unknown	lapis lazuli	cylinder	Figurative	h. 19, Ø 11	stray from surface		Özgüç T 1986:45, fig.3-42
Cy103	Kültepe	unknown	lapis lazuli	cylinder	Figurative	h. 19, Ø 12	stray from surface		Özgüç T 1986:45, fig.3-43
Cy104	Kültepe	2200-1950 BC	lapis lazuli	cylinder	Figurative	h. 24, Ø 17	level 11a	near the 'Palace'	Özgüç N. 1959:43-44
Cy105	Kültepe	unknown	lapis lazuli	cylinder	Figurative	h. 24, Ø 8	stray from surface		Bittel 1939-41:302, fig.5
Cy106	Tarsus	2400-1950 BC	faience	cylinder	Geometric	h. 25, Ø 13	at 11.65m depth	near fortification walls	Goldman 1956:238, fig.393.20, cat.no.38.1202
Cy107	Tarsus	2400-1950 BC	faience	cylinder	Geometric	h. 32, Ø 11	intrusion	unknown	Goldman 1956:238, fig.393.21, cat.no.38.1203
Os001	Alişar Hoyük	2100-1950 BC	stone	gable	Figurative	33x27	Area J35, levels 6-5M	near the later Hittite fortification gate	von der Osten 1937a:184, fig.186, cat.no.c1225
Os002	Alişar Hoyük	2100-1950 BC	stone	gable	Geometric	Ø 28	Area M34, levels 6-5M	near the later Hittite fortification gate	von der Osten 1937a:184, fig.186, cat.no.c1506
Os003	Alişar Hoyük	2100-1950 BC	stone	gable	Figurative	33x30	Area L12, level 5M	"Citadel"	von der Osten 1937a:184, fig.186, cat.no.c1839
Os004	Tarsus	unknown	black steatite	gable	Figurative	Ø 63	stray from field		Goldman 1956, 231, 237, fig.392.1
Os005	Tarsus	unknown	red serpentine	gable	Figurative	N/A	unstratified		Goldman 1956:231, 237, fig.392.2, cat.no.36.139
Os006	Tarsus	unknown	black steatite	gable	Geometric	Ø 28	unstratified		Goldman 1956:237, fig.392.12, cat.no.35.811
Os007	Tarsus	unknown	glazed steatite	button	Figurative	Ø 22	intrusion		Goldman 1956:238, fig.393.25, cat.no.38.1464
Os008	Tarsus	2600-2400 BC	black steatite	tabloid	Geometric	31x28	at 16m depth		Goldman 1956:238, fig.392.11, cat.no.47.25
Os009	Yumuktepe	2200-1950 BC	bone	gable	Figurative	25x25	room 111, level XII		Garstang 1953:218, fig.140

Figure 5.13 Summary table of non-Anatolian EBA seals found in western/central Anatolia and Cilicia.

Cat. no.	Site	Dating	Seal face shape	Seal face (mm)	Seal motif type	Reverse	Stratigraphy	Context	Reference
Sg001	Demircihöyük	2800-2750 cal BC	cylinder	5	Geometric (cylinder)	two different strings (one twisted, one smooth) running through	level F2	in a storage pit in the central courtyard of the settlement	Obladen-Kauder 1996:286, fig.136.5
Sg002	Karataş	2800-2600 BC	circular	c. Ø 30	"Aegean"	thin reeds (basket or reed mat?)	tr. MEE, level IV	from area with ceremonial feasting on the mound: large open fireplaces, mudbrick platforms, animal bones, flint blades	Mellink 1972:259, fig.55; Warner 1994:122-125
Sg003	Myrina, Lemnos	2900-2700 BC	N/A	33x10	?	most of back broken off, covered with gray hard matter; traces of string	tr. Kasoli, room A2, group 41; level Blue	associated assemblage unknown	CMS VS3 210
Sg004	Myrina, Lemnos	2700-2600 BC	circular	Ø19	"Aegean"	string and knot towards various directions, tying an unidentified object, but probably of soft material, such as a leather sack or the leather cover of a vessel mouth	tr. Saragli, level 1, Square OM12; level Green	context unknown	Dova 2003:114, fig.8; CMS VS3 209
Sg005	Bademağacı	2400-1950 BC	rectangular	22x20	"Anatolian"	parallel striations on a concave impression (wooden/stone pommel?), no trace of string	"EB II-2/3"	"Multi-Roomed Building" 2 (in the south section of the site); the room where it was found was empty	Umurtak 2010
Sg006	Troy	EBA	circular	c. 40 Ø	"Aegean"	N/A	unstratified	-	Schmidt 1902:202, no.4096
Sg100	Alişar Höyük	2800-2700 BC	circular	Ø 30	"Anatolian"	N/A	level 17M	"Citadel"	von der Osten 1937a:81-82, fig.87, cat.no.e1974
Sg101	Alişar Höyük	2500-2300 BC	circular	Ø 10	"Anatolian"	N/A	level 10M	"Citadel"	von der Osten 1937a:183, fig.186, cat.no.e824
Sg102	Alişar Höyük	2000-1950 BC	rectangular	13x13	"Anatolian"	N/A	levels 5-6M	N/A	Schmidt 1932:fig.188, cat.no.b2503
Sg103	Alacahöyük	2800-2200 BC	N/A	N/A	"Anatolian"	N/A	N/A	N/A	Koşay 1951:148, pl.108, cat.no.Al.c.301
Sg104	Kültepe	2100-1950 BC	cylinder	N/A	Figurative (cylinder)	N/A	N/A	N/A	Ezer 2014
Sg105	Kilisetepe	2100-1950 BC	N/A	N/A	not preserved	N/A	level IVa		Collon 2007:fig.43.2
Sg106	Tarsus	2100-1950 BC	cylinder	N/A	Floreal (cylinder)	N/A	late EB III levels	room 30	Goldman 1956:238, fig.398
Sg107	Tarsus	2100-1950 BC	cylinder	N/A	Geometric (cylinder)	N/A	late EB III levels	room 30	Goldman 1956:238, fig.398
Sg108	Tarsus	2100-1950 BC	cylinder	N/A	Geometric (cylinder)	N/A	late EB III levels	room 30	Goldman 1956:238, fig.398
Sg109	Tarsus	2100-1950 BC	cylinder	N/A	Geometric (cylinder)	N/A	late EB III levels	room 30	Goldman 1956:238, fig.398
Sg110	Tarsus	2100-1950 BC	cylinder	N/A	Figurative (cylinder)	N/A	late EB III levels	room 30	Goldman 1956:238, fig.398
Sg111	Tarsus	2100-1950 BC	cylinder	N/A	Figurative (cylinder)	N/A	late EB III levels	room 30	Goldman 1956:238, fig.398
Sg112	Tarsus	2100-1950 BC	cylinder	N/A	?	N/A	late EB III levels	room 30	Goldman 1956:238, fig.398
Sg113	Tarsus	2100-1950 BC	cylinder	N/A	?	N/A	late EB III levels	room 30	Goldman 1956:238, fig.398
Sg114	Tarsus	2100-1950 BC	rectangular	N/A	Geometric	N/A	late EB III levels	room 30	Goldman 1956:238, fig.398
Sg115	Yumuktepe	EBA	N/A	N/A	"Anatolian"	N/A	level XI		Palumbi 2010:fig.89

Figure 5.14 Summary table of EBA sealings found in western/central Anatolia and Cilicia.

Cat. no.	Site	Dating	Stratigraphy	Seal shape	Seal material	Seal face size	Impression's support	Motif	Description	Reference
Im001	Poliochni	2700-2600 BC	Green, insula XVII, room 859	Stamp: circular	metal?	Ø 20-21	on handle of imported jar made of very fine ware (2 impressions)	"Aegean"		Bernabò Brea 1964:401, pl.129a; CMS IS 170
Im002	Poliochni	2700-2600 BC	Green, 2nd floor of room 309	Stamp: circular	metal?	Ø 12-13	on handle of medium storage jar of probable Cycladic provenance (Scored ware)	"Aegean"		Cultraro 1997:112-113; CMS VS3 212
Im003	Karataş	2600-2400 BC	level V, on jar burial 15	Stamp: circular	metal?	Ø 19	either on the rim or the lug handle of a jar	"Anatolian"		Mellink 1964:275, fig.26
Im004	Poliochni	2600-2400 BC	Red, insula XXII, room 1028	Stamp: circular	metal	Ø 18	on top of pithos rim of imported ware	"Anatolian"	metal seal with cross motif, parallels for the motif with seal-stamped pithoi of Chalandriani and Lerna IV	Cultraro 2004:334, cat.no.213; CMS VS3 213
Im005	Troy	2600-2400 BC	level IIb, dump area within the "citadel"	Stamp: circular	metal	Ø 16	impressed on the neck of an imported "Aegean Scored ware" jar	"Aegean"		Blegen et al.1950:256, fig.408; CMS VS1B 479
Im006	Heraion	2600-2200 BC	Square F8/74	Stamp: circular	N/A	Ø 24	on the neck of jar	"Aegean"		Milojcic 1961:pl.49,2
Im007	Poliochni	2400-2200 BC	Yellow, room 407b within megaron 605 complex	Cylinder	N/A	h. 20	impressed on a band around the shoulder and the handle of a pithos of clear local production	Figurative (Cylinder)	cylinder with negative carving, for positive impression	Benvenuti 1988-1989
Im008	Troy	2400-2200 BC	"Third Burnt City"	Stamp: circular	metal?	Ø 20	on the handle of large pithos of local production	"Anatolian"		Schliemann 1881:459, fig.482-483
Im009	Troy	2400-2200 BC	"Third Burnt City"	Cylinder	N/A	h. 32	rolled in two separate bands across the shoulder of large pithos of local production	Geometric (Cylinder)	linear geometric motif?	Schliemann 1881:459, fig.482-483
Im010	Heraion	2400-2200 BC	level III , Square F6	Cylinder	N/A	N/A		Geometric (Cylinder)		Milojcic 1961:65, table 31-3
Im011	Heraion	2400-2200 BC	level III, Square F6/1-10	Cylinder	N/A	N/A		Geometric (Cylinder)		Milojcic 1961:65, table 31-4
Im012	Heraion	2200-1950 BC	level V	Cylinder	N/A	N/A	on the shoulder of a storage jar	Figurative (Cylinder)		Isler 1973:175; Kouka 2002:293
Im013	Methymna	EBA	unstratified	Cylinder	N/A	N/A		Geometric (Cylinder)		Buchholz 1975:233, pl.26b
Im100	Yumuktepe	2400-1950 BC	intrusion? In level XI	Cylinder	N/A	N/A	on red-coated vessel	Figurative (Cylinder)	Motif seems Jemdet Nasr	Garstang 1953:234, fig.150.17
Im101	Yumuktepe	2400-1950 BC	intrusion? In level XI	Stamp: circular	N/A	N/A	on red-coated vessel	"Anatolian"	On same pot as Im100	Garstang 1953:234, fig.150.17
Im102	Tarsus	2600-2400 BC	room 112, EB II levels	Stamp: oval	N/A	N/A	on handle of red gritty pitcher	"Anatolian"		Goldman 1956:240, fig.396.1, cat.no.47.123
Im103	Tarsus	2600-2400 BC	inside fortification wall I	Stamp: circular	N/A	Ø 22	on handle of red gritty pitcher	unknown	motif not clear	Goldman 1956:240, fig.396.2
Im104	Tarsus	2600-2400 BC	among stones of Late EB II fortification wall	Stamp: circular	N/A	Ø 30	on handle of sand buff clay pitcher	Geometric (Stamp)		Goldman 1956:240, fig.396.3
Im105	Tarsus	2600-2400 BC	south of room 116, EB II levels	Stamp: circular	N/A	Ø 42	on handle of red gritty cup	Geometric (Stamp)		Goldman 1956:240, fig.396.4, cat.no.48.2
Im106	Tarsus	2400-1950 BC	EB III levels, at 12-11m depth	Cylinder	N/A	N/A	on side of red gritty pot	Geometric (Cylinder)	branching lines	Goldman 1956:240, fig.397.5, cat.no.38.1227
Im107	Tarsus	2400-1950 BC	EB III levels, room 45	Cylinder	N/A	N/A	on side of red gritty bowl	Geometric (Cylinder)	Zigzag, two impressions of the same seal.	Goldman 1956:240, fig.397.6, cat.no.38.875
Im108	Tarsus	2400-1950 BC	EB III levels, room 45	Stamp: circular	N/A	N/A	on side of red gritty bowl	"Anatolian"	On same pot as Im107	Goldman 1956:240, fig.397.6, cat.no.38.875
Im109	Tarsus	2400-1950 BC	EB III levels, room 36	Cylinder	N/A	N/A	on side of buff bowls	Geometric (Cylinder)	same seal on two separate fragments, possibly belonging to the same bowl	Goldman 1956:240, fig.397.7-8, cat.no.38.791

Figure 5.15 Summary table of EBA seal-impressed pottery found in western Anatolia and Cilicia.

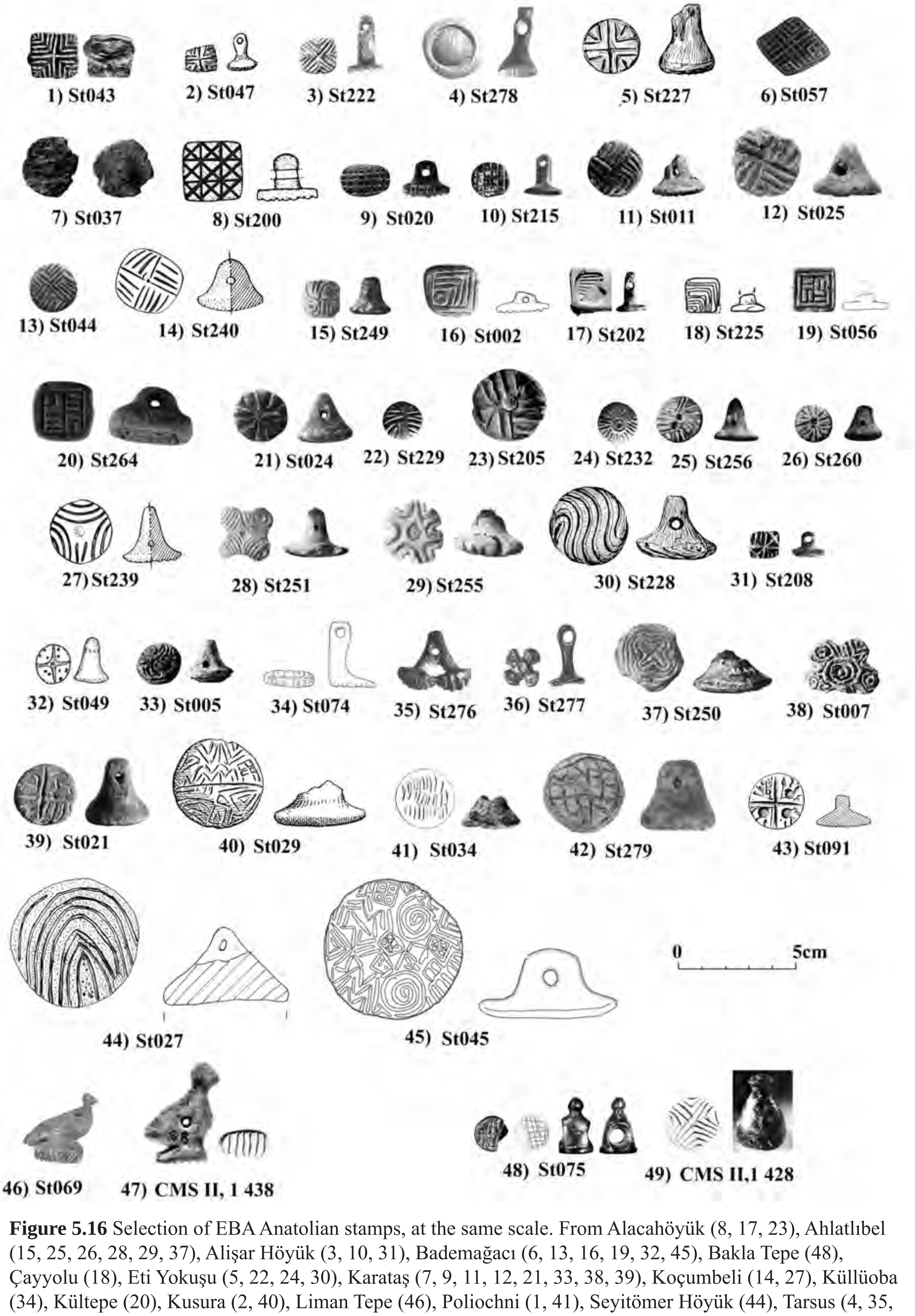


Figure 5.16 Selection of EBA Anatolian stamps, at the same scale. From Alacahöyük (8, 17, 23), Ahlatlıbel (15, 25, 26, 28, 29, 37), Alişar Höyük (3, 10, 31), Bademağacı (6, 13, 16, 19, 32, 45), Bakla Tepe (48), Çayyolu (18), Eti Yokuşu (5, 22, 24, 30), Karataş (7, 9, 11, 12, 21, 33, 38, 39), Koçumbeli (14, 27), Küllüoba (34), Kültepe (20), Kusura (2, 40), Liman Tepe (46), Poliochni (1, 41), Seyitömer Höyük (44), Tarsus (4, 35, 36, 42), Thermi (43), Trapeza, Crete (47, 49). For reference to individual stamps, cf. figure 5.12 (nos. 47 and 49 are taken from the ARACHNE database).

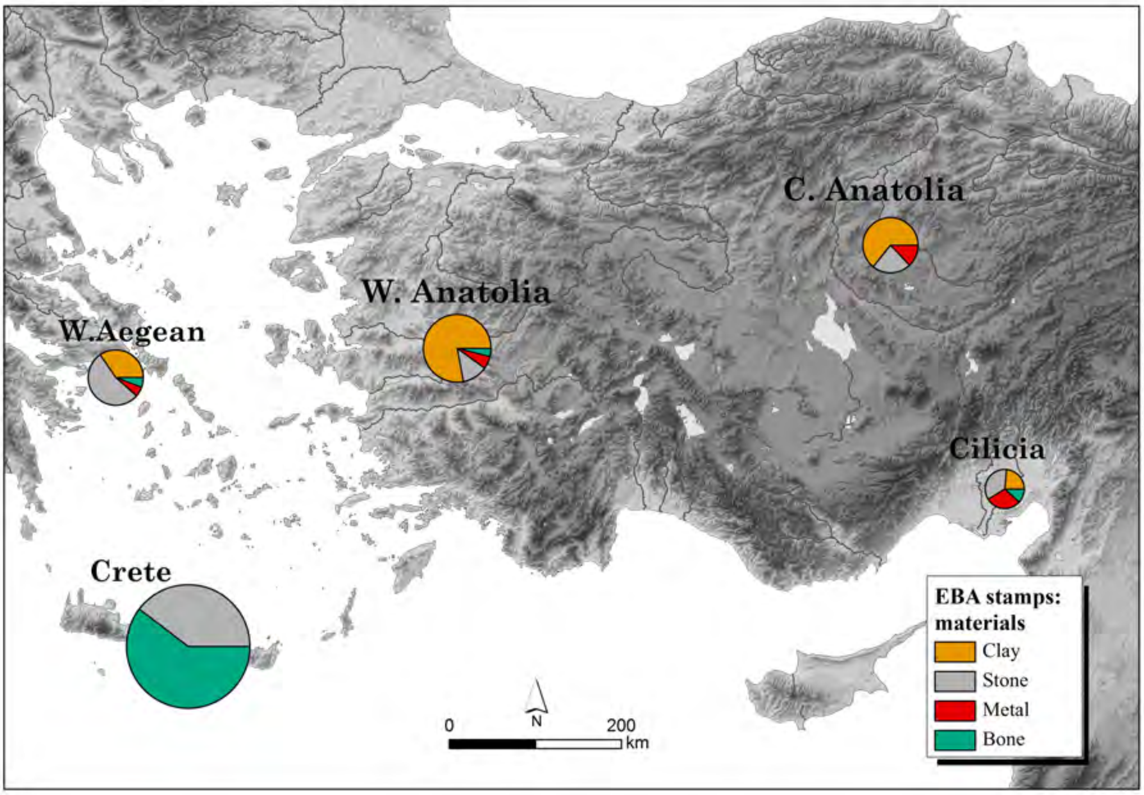


Figure 5.17 Map showing the proportion of different materials employed for the production of stamps during the EBA in Anatolia, Cilicia, Crete and western Aegean (data for Crete and mainland Greece from ARACHNE database).

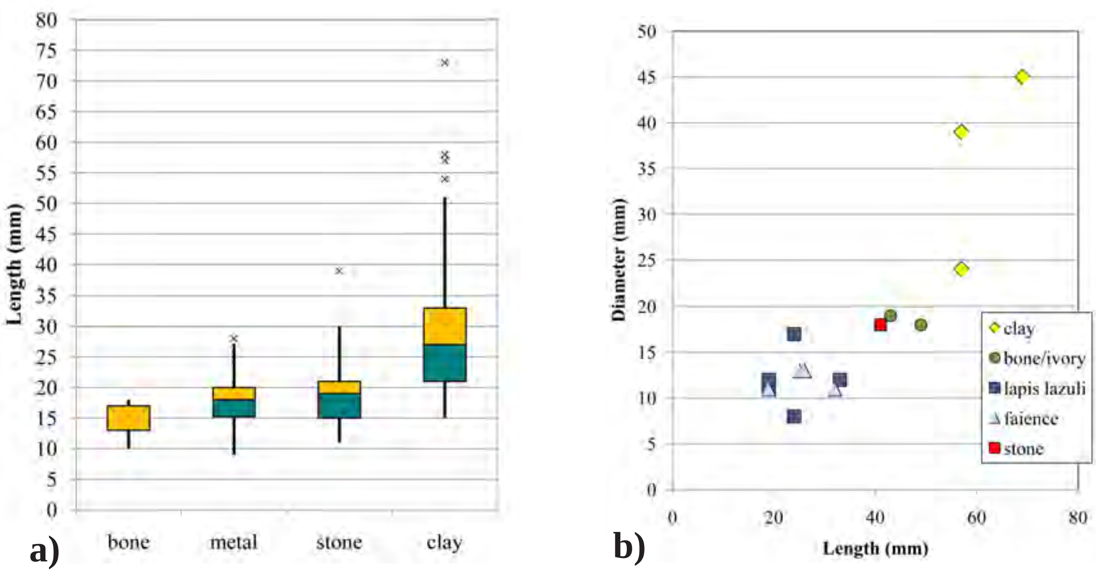


Figure 5.18 a) Box and whiskers plot showing the correlation between size of the stamping surface and manufacturing material for EBA Anatolian and Cilician stamps. b) Scatter plot showing the correlation between size of cylinder and stamp-cylinder seals and manufacturing materials for EBA Anatolian and Cilician examples.

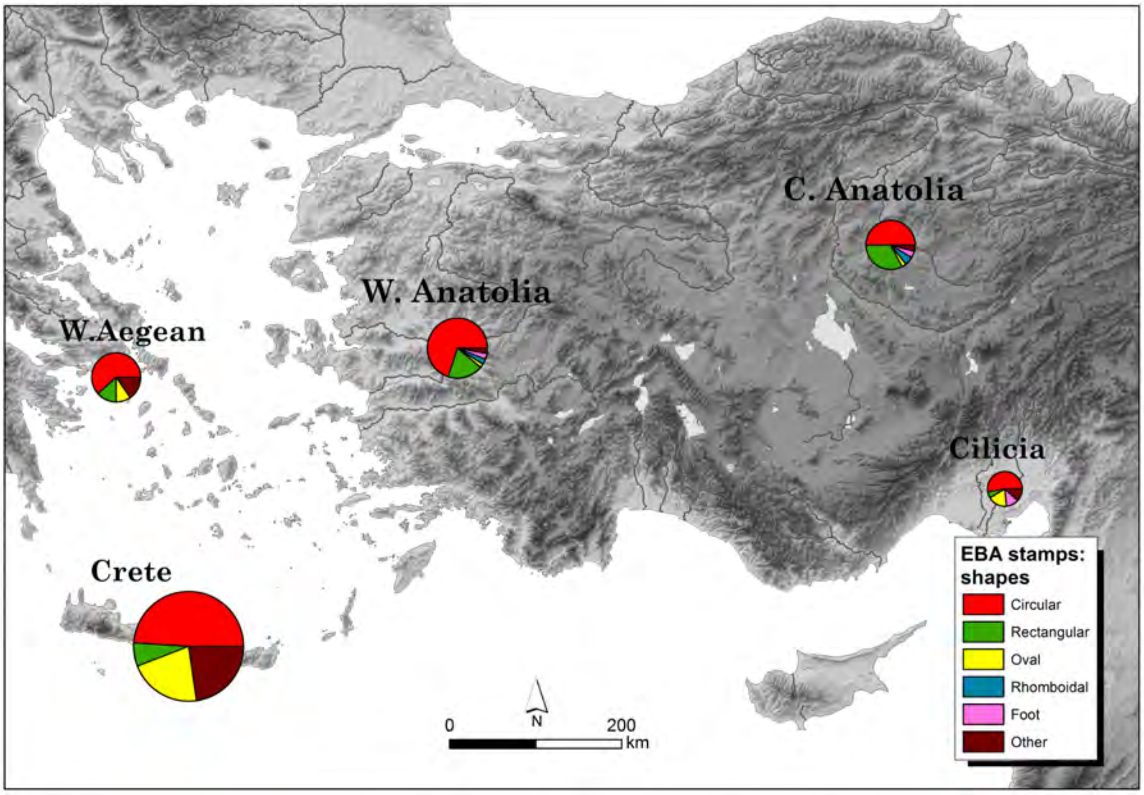


Figure 5.19 Map showing the frequency of different stamping surface shapes during the EBA in Anatolia, Cilicia, Crete and western Aegean (data for Crete and mainland Greece from ARACHNE database).

Figure 5.20 “Trinket moulds” found in late EBA Anatolia: 1) allegedly from Akhisar, black market (Canby 1965), 2) from Küllüoba phase IIC (Efe 2006), 3) allegedly from İzmir, black market (Canby 1965).

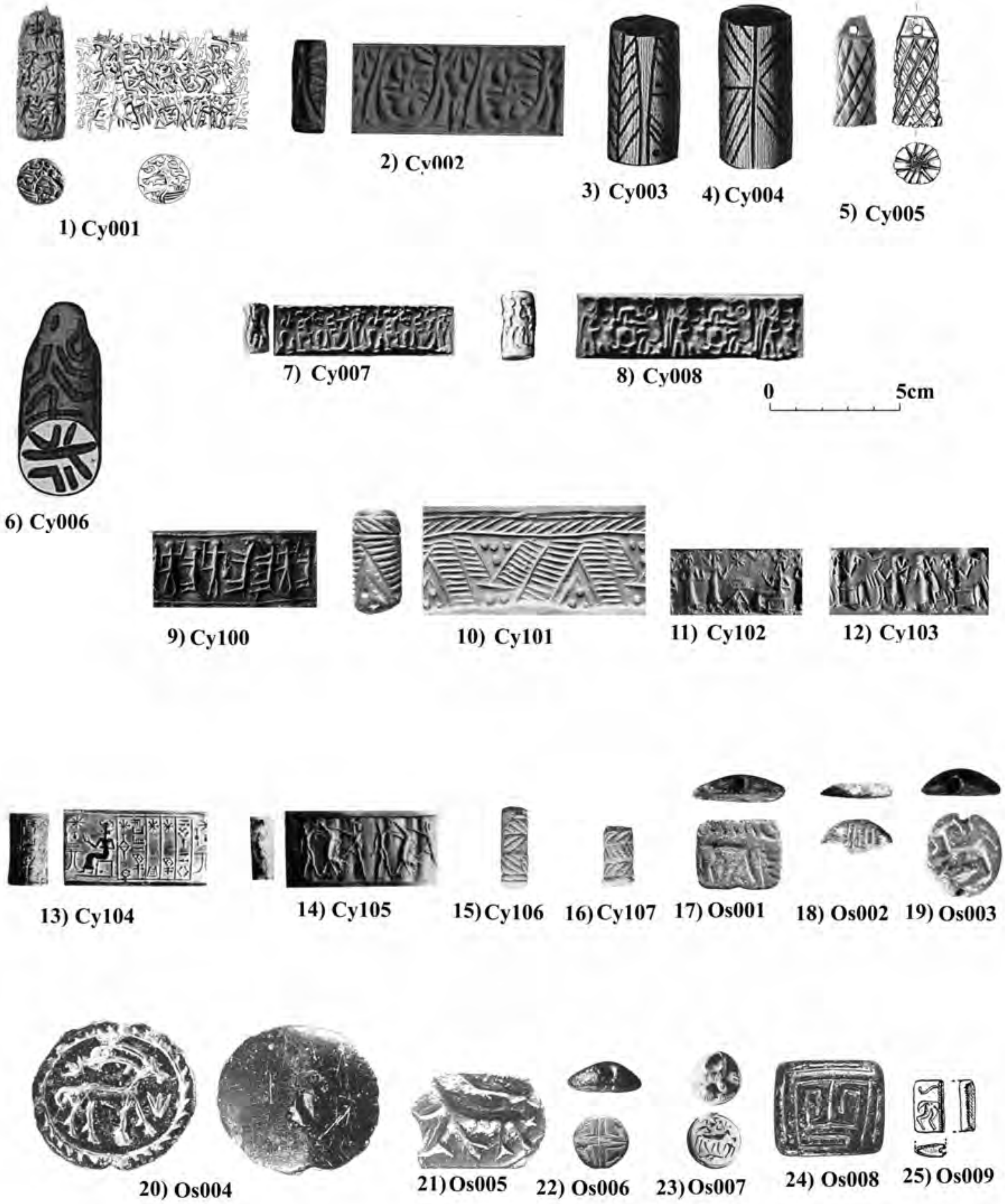


Figure 5.21 EBA seals found in Anatolia and Cilicia whose origin is suggested as "non-Anatolian" on typological grounds, at the same scale. From Alacahöyük (9), Alişar Höyük (10, 17-19), Kültepe (11-14), Poliochni (1), Seyitömer (7-8), Tarsus (15-16, 20-24), Troy (2-6), Yumuktepe (25). For reference to individual seals, cf. figure 5.13.

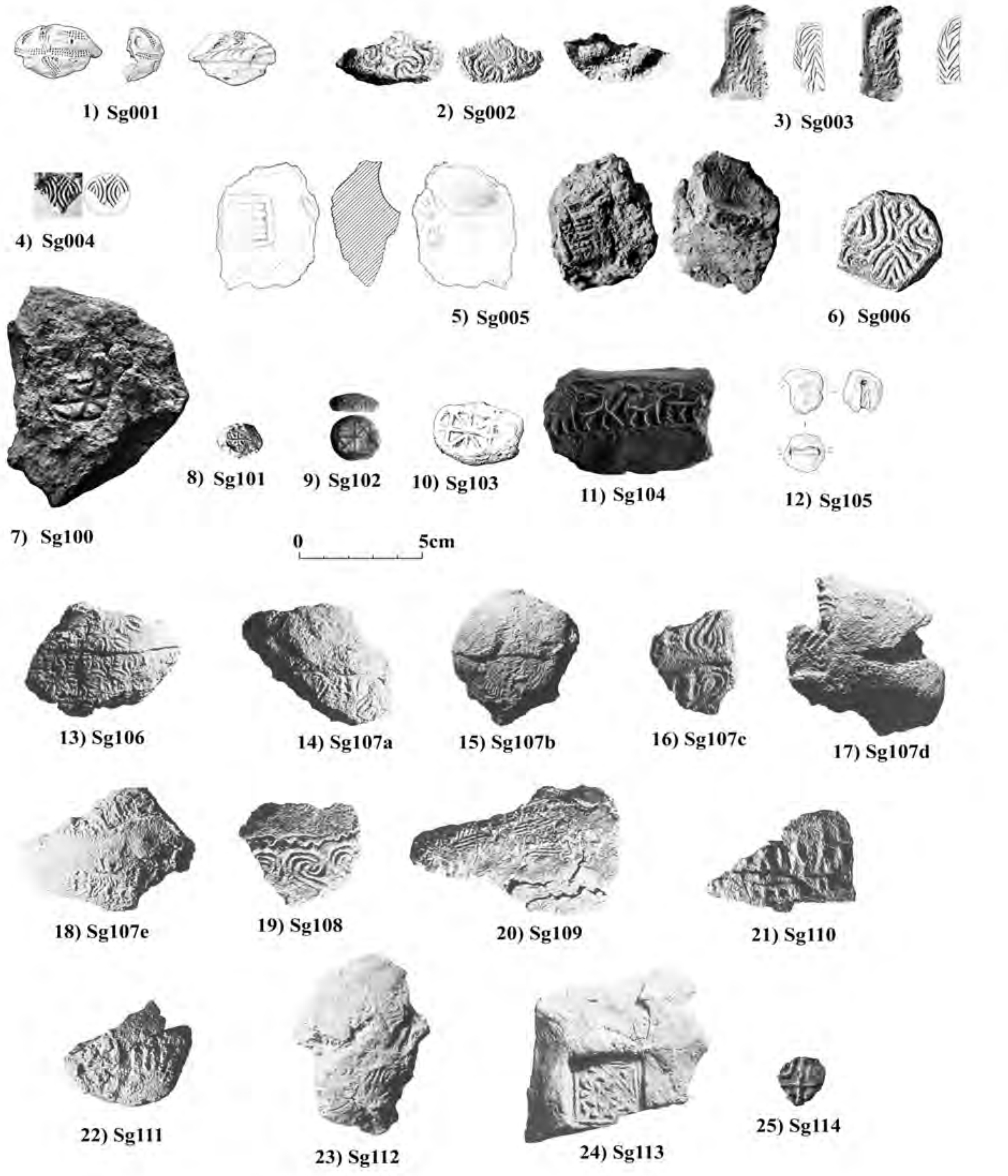


Figure 5.22 EBA sealings found in Anatolia and Cilicia, at the same scale. From Alacahöyük (10), Alişar Höyük (7-9), Bademağacı (5), Demircihöyük (1), Karataş (2), Kilisetepe (12), Kültepe (11), Myrina (3-4), Tarsus (13-24), Troy (6), Yumuktepe (25). For reference to individual sealings, cf. figure 5.14.

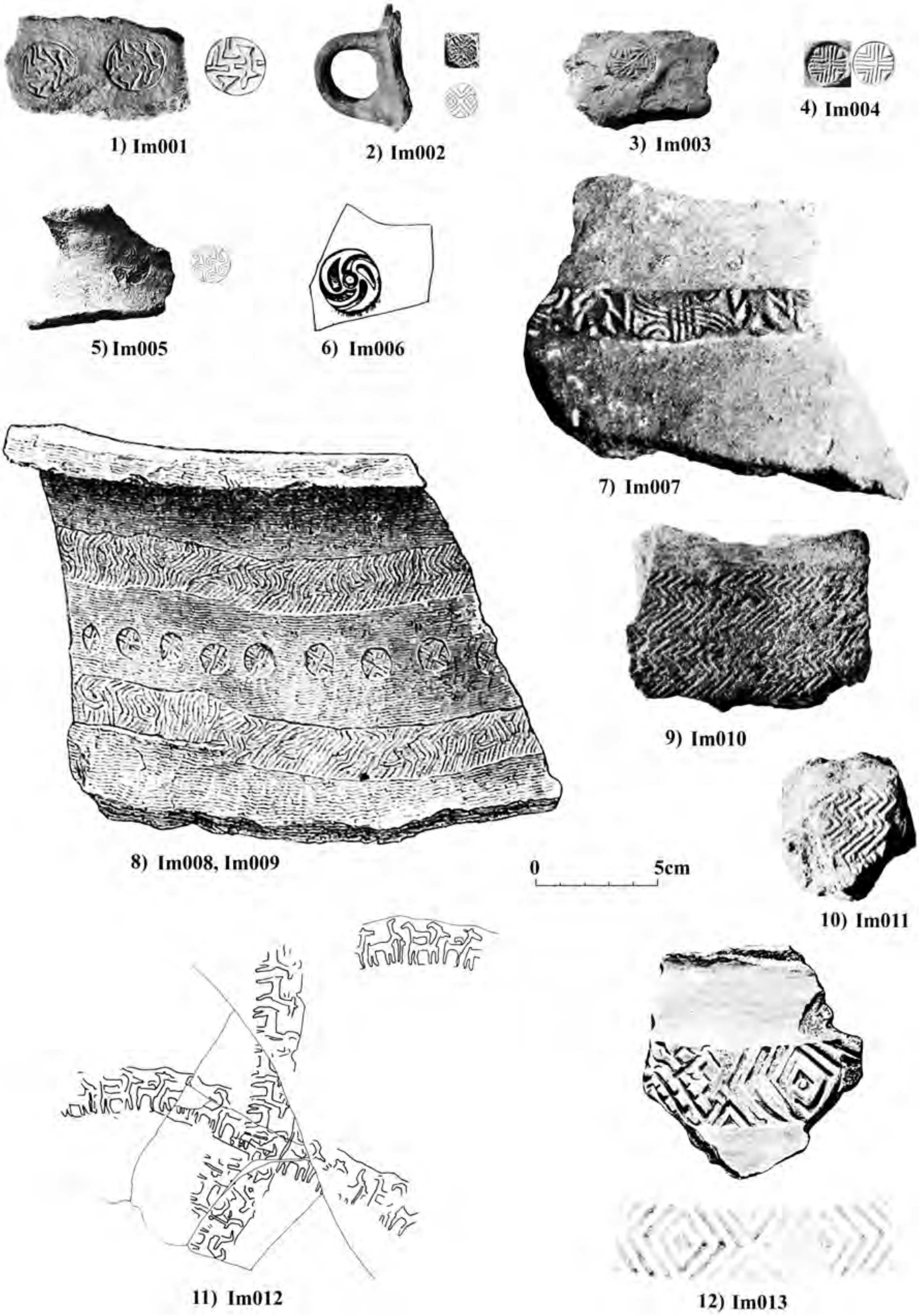


Figure 5.23 EBA seal-impressed pottery found in Anatolia, at the same scale. From Heraion (6, 9-11), Karataş (3), Methymna (12), Poliochni (1-2, 4, 7),Troy (5, 8). For reference on individual finds cf. figure 5.15.

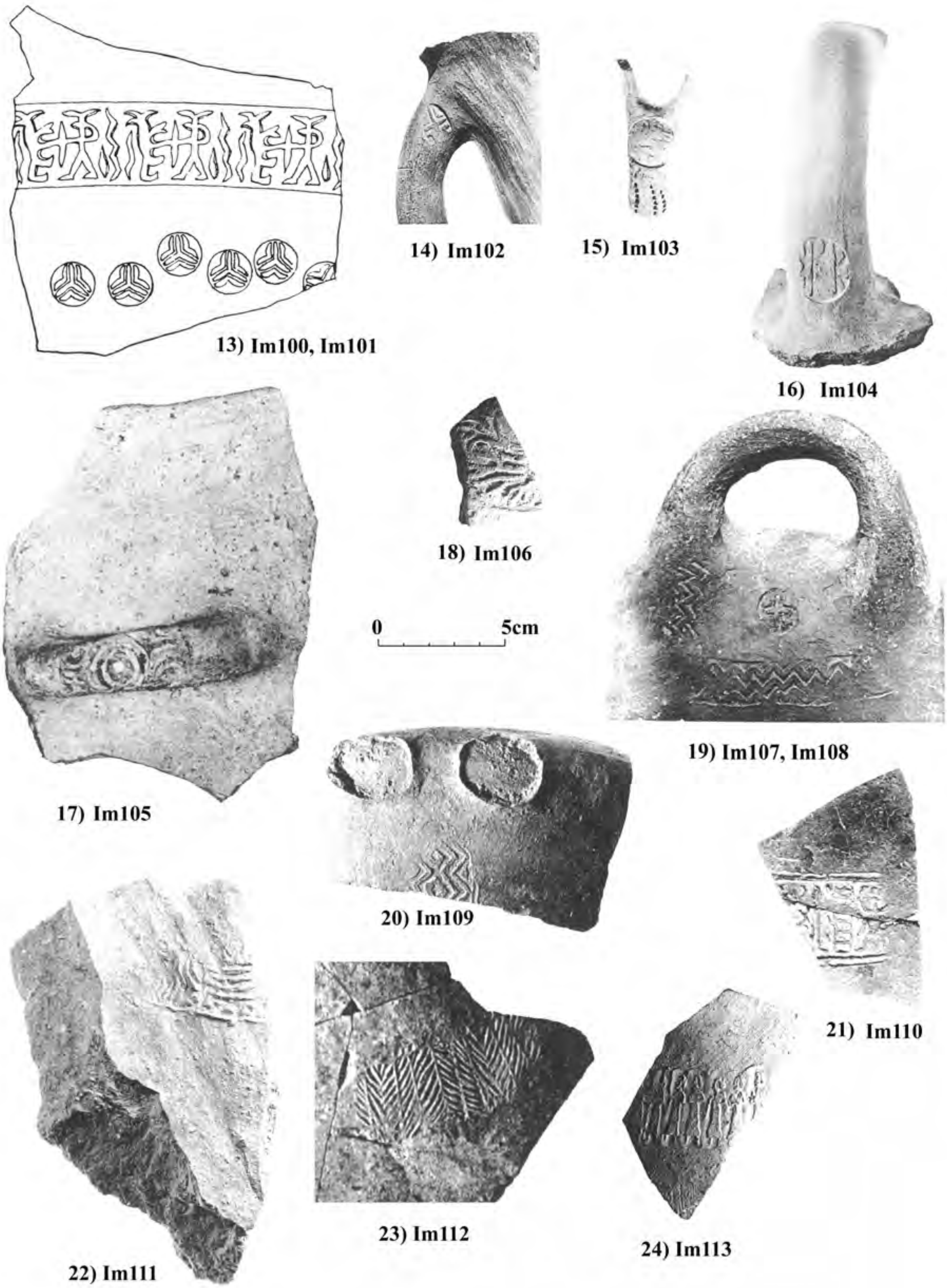


Figure 5.23 (continued) EBA seal-impressed pottery found in Cilicia, at the same scale. From Tarsus (14-24), Yumuktepe (13). For reference on individual finds cf. figure 5.15.

Cat. no.	Site	Stratigraphy	Deposition context: dating	Manufacture: style	Manufacture: dating	Material	Shape	Motif type	Reference
Cy001	Poliochni	Yellow	2300-2200 BC	Early Dynastic I/II	c.2900-2600 BC	ivory	stamp-cy	Figurative	Bernabò Brea 1976:298–300, pl.254; CMS IS 066
Cy002	Troy	IIg	2300-2200 BC	Jemdet Nasr	c.3100-2900 BC	lapis lazuli	cylinder	Floreal	Schliemann 1881:464, figs.502-503; Dörpfeld 1902:fig.447
Cy101	Alişar Hoyük	8M	2300-2200 BC	Jemdet Nasr	c.3100-2900 BC	diorite	cylinder	Geometric	Bittel 1939-41:299, fig.2; von der Osten 1937a:183, fig.186, cat.no.e455
Os001	Alişar Hoyük	5-6M	2100-1950 BC	Jemdet Nasr	c.3100-2900 BC	stone	gable	Figurative	von der Osten 1937a:184, fig.186, cat.no.c1225
Os002	Alişar Hoyük	5-6M	2100-1950 BC	Jemdet Nasr	c.3100-2900 BC	stone	gable	Geometric	von der Osten 1937a:184, fig.186, cat.no.c1506
Os003	Alişar Hoyük	5-6M	2100-1950 BC	Jemdet Nasr	c.3100-2900 BC	stone	gable	Figurative	von der Osten 1937a:184, fig.186, cat.no.c1839
Os009	Yumuktepe	XII	2200-1950 BC	Jemdet Nasr	c.3100-2900 BC	bone	gable	Figurative	Garstang 1953:218, fig.140

Figure 5.24 Summary table of non-Anatolian seals found in western/central Anatolia within late EBA contexts, but whose stylistic iconography suggests a much earlier manufacture.

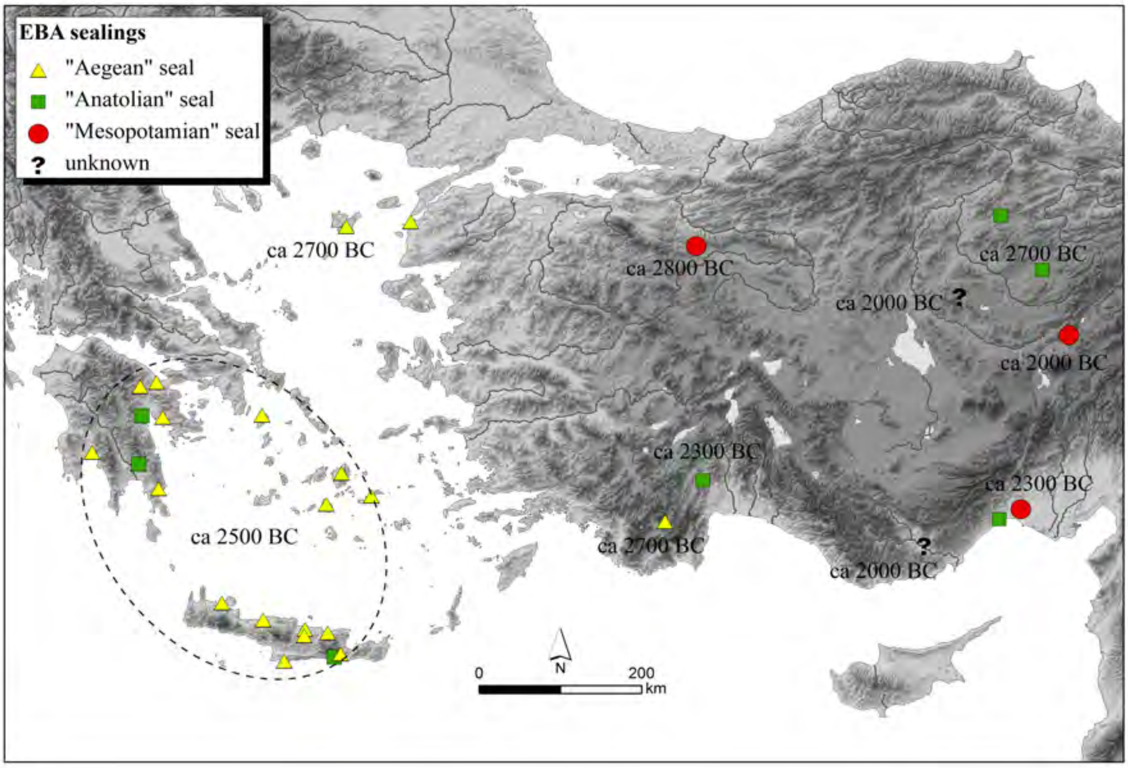


Figure 5.25 Map showing the spatial distribution of sealings in EBA Anatolia and the Aegean, divided according to the likely origin of the impressed motif. Approximate dates for the archaeological contexts in which the sealings were found are also provided. For the western Aegean and Cretan dataset cf.Aruz 2008; Pullen 1994; Schoep 2006; Webb and Weingarten 2012; Weingarten et al.2011.

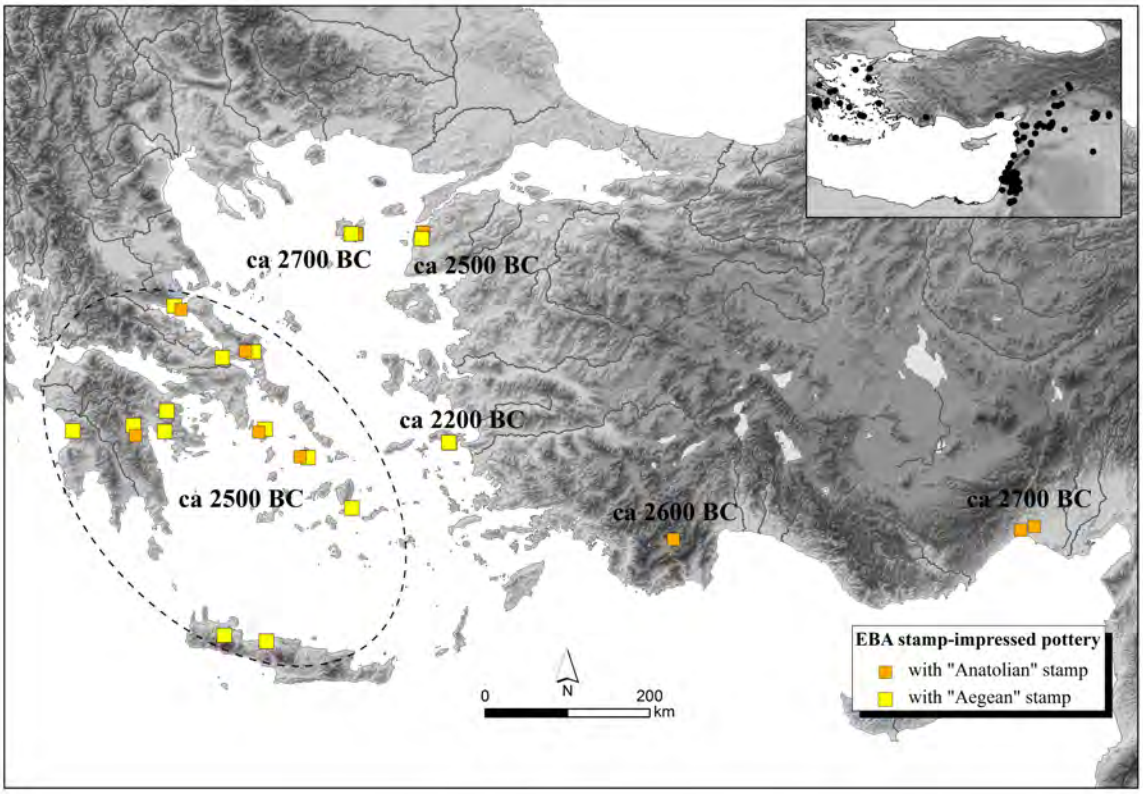


Figure 5.26 Map showing the distribution of EBA seal-impressed pottery made with stamp seals, in Anatolia and the Aegean. The approximate dates for the archaeological contexts in which the objects were found are also provided. The inset shows the distribution of seal-impressed pottery in Upper Mesopotamia and the Levant. Data regarding the Aegean corpus are taken from Aruz 2008; Pullen 1994; Schoep 2006; Webb and Weingarten 2012; Weingarten et al.2011.

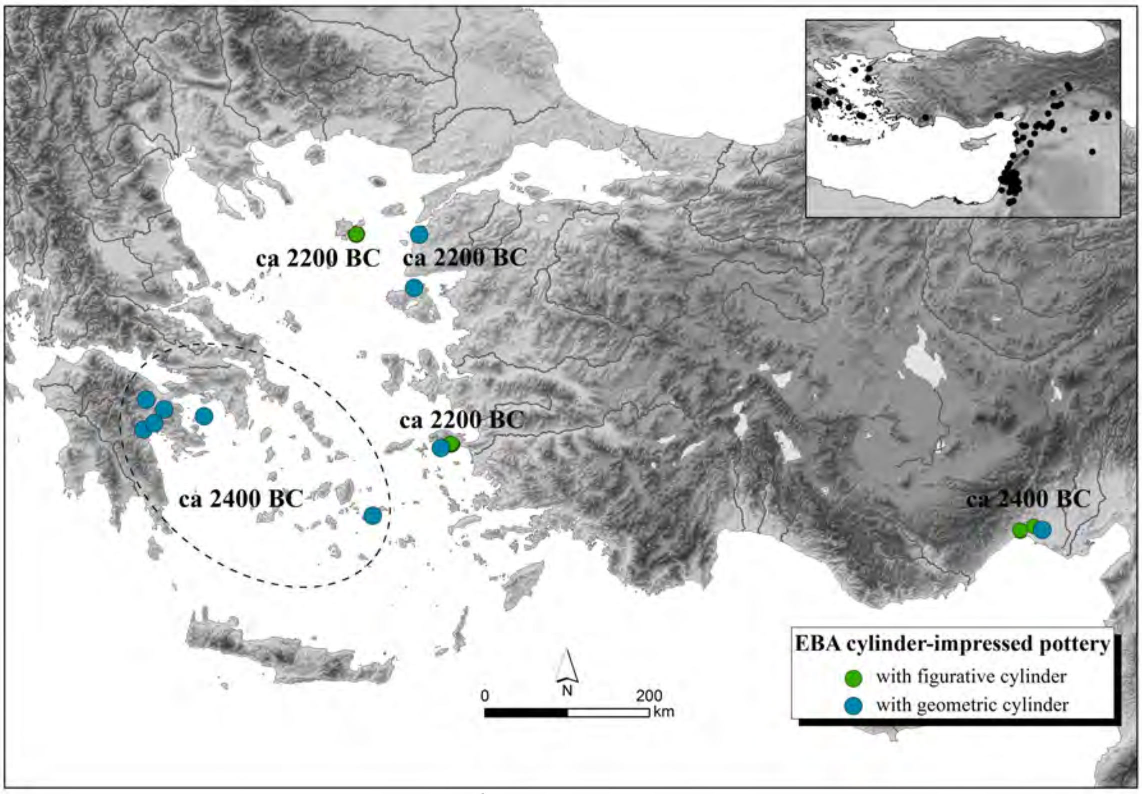


Figure 5.27 Map showing the distribution of EBA seal-impressed pottery made with cylinder seals, in Anatolia and the Aegean. The approximate dates for the archaeological contexts in which the objects were found are also provided. The inset shows the distribution of seal-impressed pottery in Upper Mesopotamia and the Levant. Data regarding the Aegean corpus are taken from Aruz 2008; Pullen 1994; Schoep 2006; Webb and Weingarten 2012; Weingarten et al.2011.

Inv.no.	Site	Period	Stamp		Cylinder	
			"Aegean"	"Anatolian"	Figurative	Geometric
Im001	Poliochni	2700-2600 BC	imported "Aegean" fine ware			
Im002	Poliochni	2700-2600 BC	imported "Scored Ware"			
Im003	Karataş	2600-2500 BC		local pithos ware		
Im004	Poliochni	2600-2400 BC		imported pithos ware		
Im005	Troy	2500-2400 BC	imported "Aegean" ware			
Im007	Poliochni	2400-2200 BC			local pithos ware	
Im008-009	Troy	2400-2200 BC		local pithos ware		local pithos ware
Im012	Heraion	2400-2200 BC			local pithos ware	
Im013	Methymna	?				local pithos ware
Im100-101	Yumuktepe	late 3rd mill.		local pithos ware	local pithos ware	
Im102	Tarsus	2600-2400 BC		local "Red Gritty" ware		
Im105	Tarsus	2600-2400 BC		local "Red Gritty" ware		
Im106	Tarsus	2400-1950 BC				local "Red Gritty" ware
Im107	Tarsus	2400-1950 BC		local "Red Gritty" ware		
Im108	Tarsus	2400-1950 BC				local "Red Gritty" ware
Im109	Tarsus	2400-1950 BC				local buff ware
Im110	Tarsus	2400-1950 BC			local "Red Gritty" ware	
Im111	Tarsus	2400-1950 BC			local "Red Gritty" ware	
Im112	Tarsus	2400-1950 BC				local "Red Gritty" ware
Im113	Tarsus	2400-1950 BC			local "Red Gritty" ware	

Figure 5.28 Cross table comparing the seal motifs and fabrics of EBA Anatolian and Cilician seal-impressed pottery. While most of the seal-impressed vessels are apparently “local”, a few jars from Poliochni and Troy seem to have been acquired from the central Aegean area.

Site	TotalMBA seals	EBA motifs on MBA stamps	Total MBA sealings	EBA motifs on MBA sealings	Reference
Kültepe	N/A	N/A	419	1 (0.2%)	Özgüç N and Tunca 2001
Acemhöyük	N/A	N/A	55	0	Özgüç N 1988
Alişar Höyük	76	4 (5.3%)	52	1 (1.9%)	von der Osten 1937b:205-229
Konya-Karahöyük	24	5 (20.8%)	431	3 (0.7%)	Alp 1968

Figure 5.29 Cross table showing the proportion of EBA-reminiscent motifs in early 2nd millennium BC stamp seals and sealings. Note that, in all cases, MBA sealings are very rarely impressed with seals that have simpler EBA-reminiscent motifs.

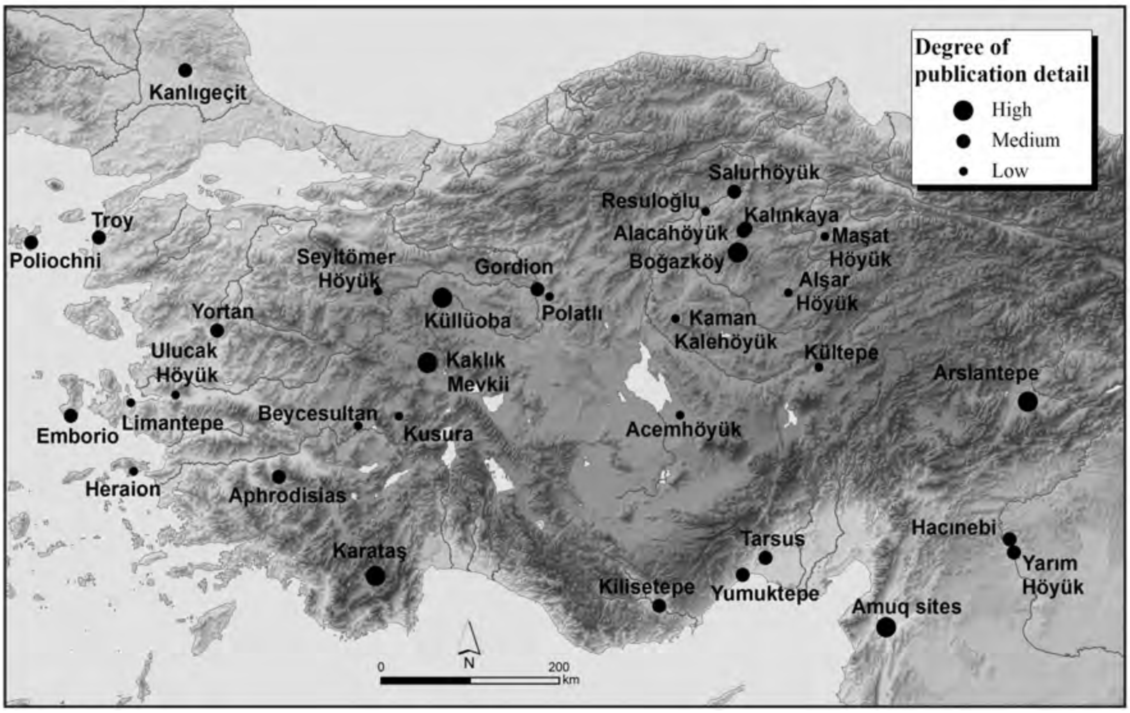


Figure 5.30 Map showing the sites with analysed late EBA pottery assemblages mentioned in the text. Symbol size reflects the degree of detail provided in the publications.

Site Name	Degree of detail	Site size	Type	Context	Stratigraphy	Period	Sample size	Ratio		Wheelmade pottery classes					References
								Wheel	Hand	Plates	Bowls	Drink	Pouring	Other	
Küllüoba	High	6ha	Settl.	Public	levels IIIC to IID	2400 -> 1950	>10000	3-20%	97-80%	80%	9%	6%	4%	1%	Türkteki 2010, 2014
Polatlı	Low	5ha	Settl.	Domestic	levels 8 to 15	2300 -> 1950	59	10%	90%		66%	33%			Lloyd and Gökçe 1951
Gordion	Medium	20ha?	Settl.	Domestic	trench PN 3	2100 ->	66	20%	80%		60%	10%	30%		Günter 1991
Kültepe	Low	30ha+	Settl.	Public	levels 13 to 11a	2400 -> 1950	>1000	?	?	many		many			Ezer 2013, 2014; Özgüç 1986
Maşat Höyük	Low	8ha	Settl.	Domestic		c.2100	94	2%	98%		100%				Emre 1979
Kaman Kalehöyük	Low	10ha	Settl.	Domestic	levels IVb and IVa	2100 -> 1950	>100	50%	50%						Bong et al. 2010; Omura 2000, 2002
Salur North	Medium	small	Cem.	Poor		c.2000	26	7.50%	92.50%		100%				Iİbiş and Durmuş 2010
Resuloğlu	Low	small	Cem.	Wealthy		c.2200	?	10%	90%						Tayfun Yıldırım pers.comm. KST 34
Alişar Höyük	Low	20ha	Settl.	Dom+Pub	levels 6M to 5M	2100 -> 1950	>500	little	most						von der Osten 1937a
Kalınkaya	Medium	1ha	Cem.	Poor		c.2100	6	33%	66%		100%				Zimmermann 2006
Beycesultan	Low	20ha	Settl.	Domestic	levels XIIa to IX	2100 -> 1950	239	14%	86%	16%	52%	24%	8%		Lloyd and Mellaart 1962
Karataş	High	small	Settl.	Domestic	levels VI:1/2	2400 -> 2300	55	10%	90%	33%	33%	33%			Eslick 2009
Kaklık Mevkii	High	1ha	Cem.	Poor	cemetery area A	2400 -> 2300	53	13%	87%	14%	72%	14%			Topbaş et al.1998
Kanlıgeçit	Medium	2ha	Settl.	Dom+Pub	levels KG 2-1	2300 -> 2100	>1000	little	most	95%			5%		Özdoğan and Parzinger 2012
Yortan	Medium	?	Cem.	Poor	class C pottery	c.2300	24	38%	62%		37%	37%	25%		Kamil 1982
Ulucak Höyük	Low	1ha	Settl.	Domestic		2300 -> 2000	23	8%	92%		100%				Çilingiroğlu et al.2004
Emporio	Medium	2ha	Settl.	Domestic	period I	2200 -> 2100	>1000	little	most	some	some	some			Hood 1982
Troy	Medium	10ha	Settl.	Public	levels IIb to IV	2400 -> 1950	>1000	30-40%?	70-60%?	many	many	many	some	some	Blegen et al. 1950, 1951; Frirdich 1997
Aphrodisias	Medium	15ha	Settl.	Domestic	Acr.tr.3-4 complexes V-I	2200 -> 1950	>1000	30-45%	70-55%	some	some	some			Sharp-Joukowsky 1986
Kilisetepe	High	2ha	Settl.	Domestic	levels Vf-IVa	2100 ->	>1000	50%	50%						Symington 2007
Boğazköy	High	6ha	Settl.	Domestic	levels 9-8c	2100 ->	306	32-	68-51%		48%	11%	41%		Orthmann 1963b
Alacahöyük	Medium	9ha	Settl.	Domestic	levels 5 to 4b	2100 -> 1950	?	some	most						Gürsan-Salzmann 1992
Poliochni	Medium	8ha	Settl.	Domestic	level Brown 1	2100 -> 1950	?	20%	80%	most	most				Cultraro 2007

Figure 5.31 Summary table presenting the data from 23 analysed late EBA Anatolian sites. Cf. figure 5.30 for their location.

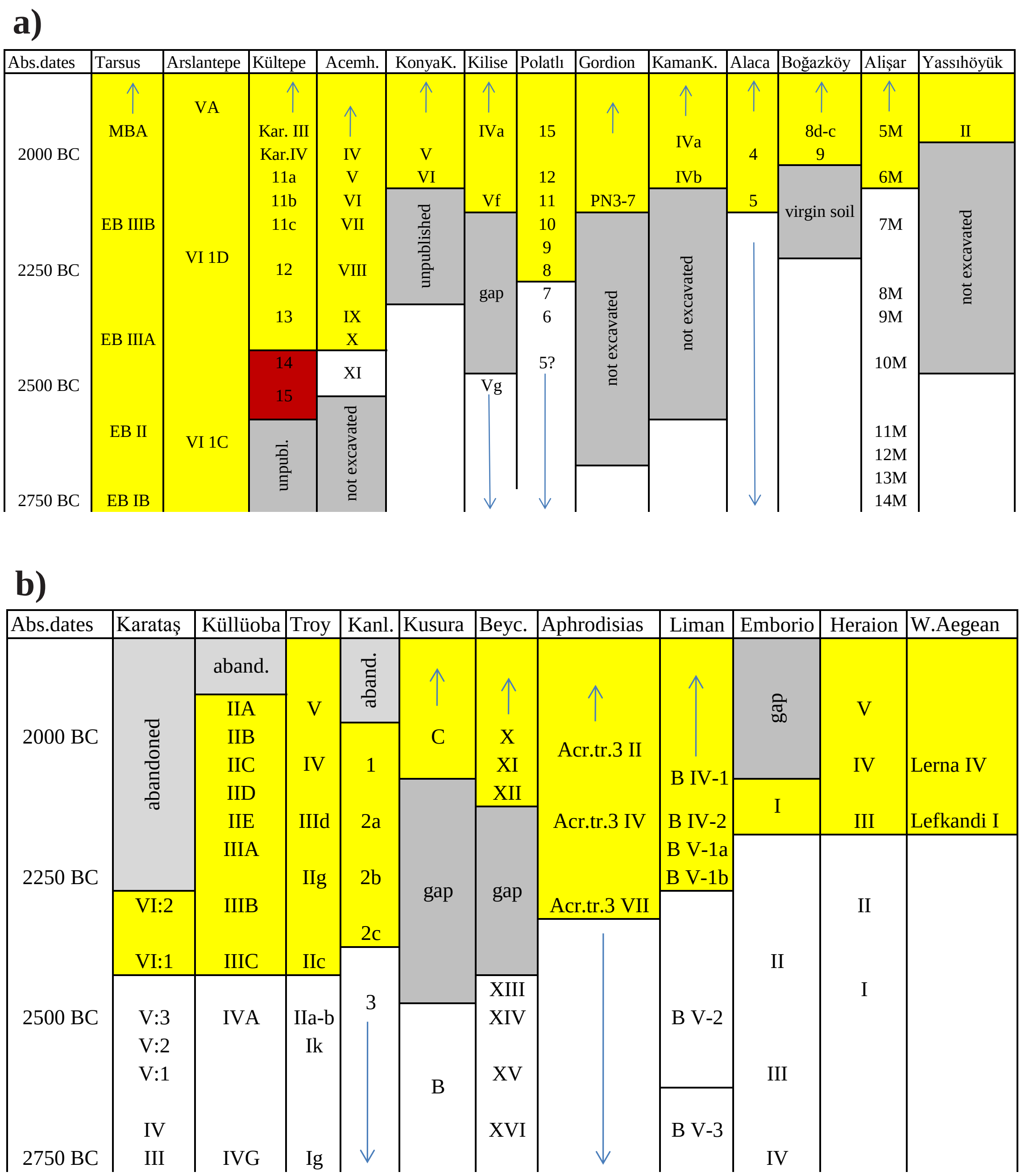


Figure 5.32 Chronological table of main well-stratified sites in late EBA Anatolia, with site relative chronology and approximate absolute dates for (a) central Anatolia, (b) western Anatolia. Yellow indicates the presence of local wheelmade pottery on site, red indicates the presence only of imported weelmade pottery, gray indicates absence of data. Note the dearth of well-investigated pre-2500 BC levels in central Anatolian sites.

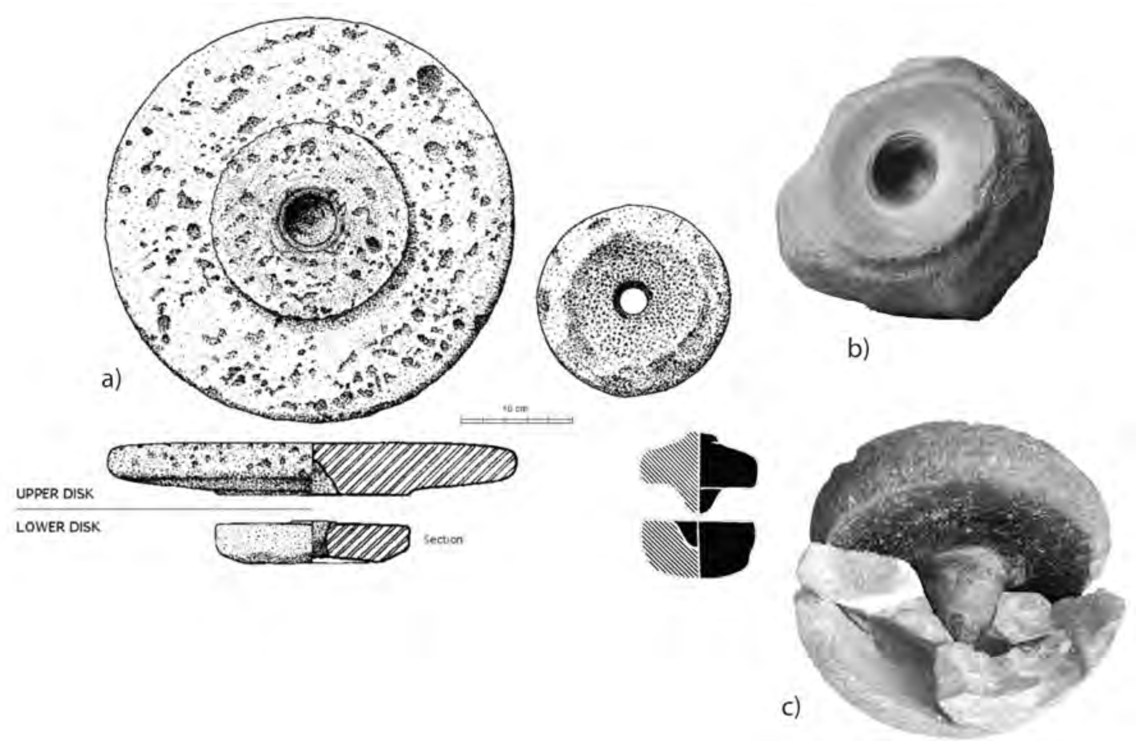


Figure 5.33 Examples of wheel devices from a) EBA Tell Yarmouth (slow wheel, Roux and de Miroschedji 2009:fig.3), b) late EBA Troy (slow wheel, Dörpfeld 1902:pl.146.IV), c) MBA Jericho (tenon wheel, Roux 2009b:P05).

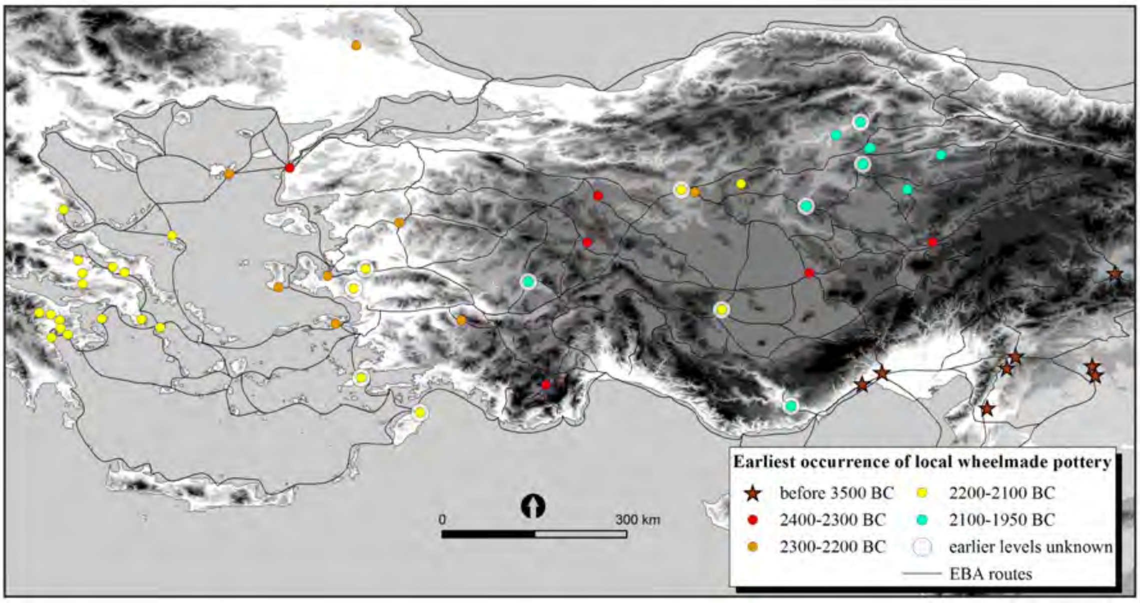


Figure 5.34 Map showing the westward diffusion of the potter's wheel technology, with approximate absolute dates for the first appearance of locally-produced wheelmade pottery at each site. Reconstructed main sea and land routes are also sketched on the background.

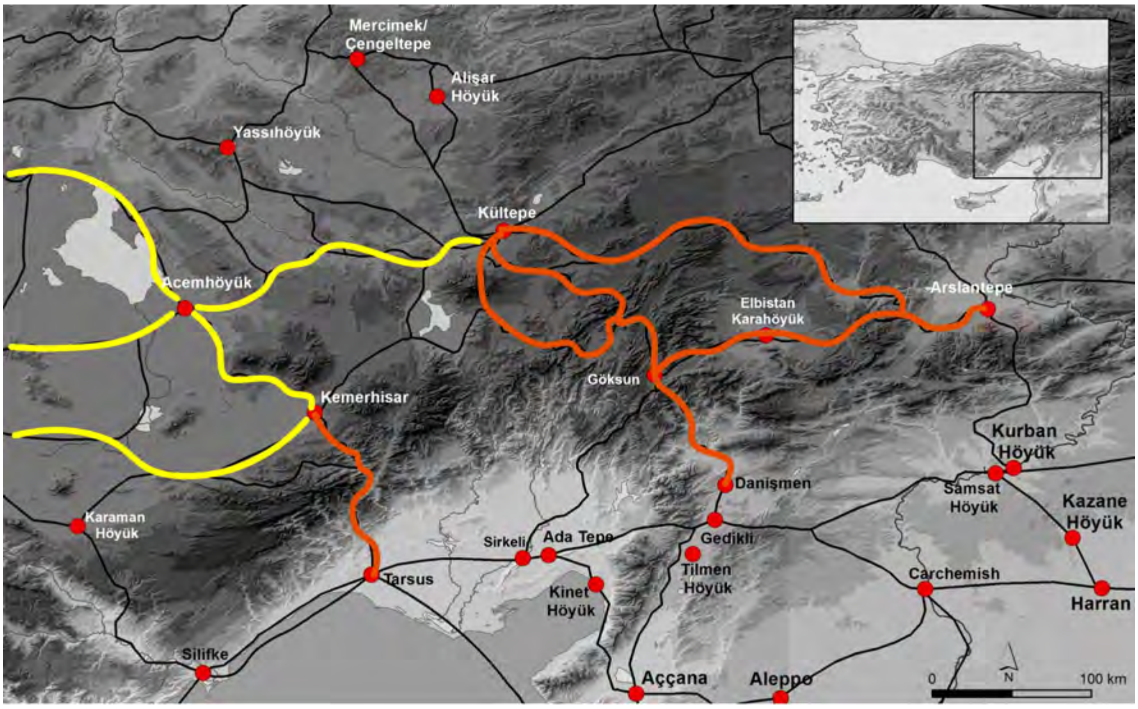


Figure 5.35 Map of possible routes followed by the diffusion of the potter's wheel technology into central Anatolia (c.2400 BC).

Map No.	Site name	Detail	Period	Total sample	Chipped stone (%)		Obsidian cores		Notes	Reference
					Obsidian	Other	Cortical	Decorticated		
11	Ahlatlı Tepecik	very low	EB I	?	-	-	-	-	very little obsidian, mostly local materials	Mitten and Yuğrum 1969:127
27	Ahlatlıbel	low	EB II	107	2.8	97.2	no	no		Koşay 1934:55-58
30	Alacahöyük	low	EB II- EB III	45	24.0	76.0	-	-		Kosay and Akok1973:111-112; Renfrew 1966:40
32	Alişar Höyük	very low	EB I> EB III	?	-	-		yes	obsidian implements are fairly abundant in all levels but no exact information is provided	von der Osten 1937a:82, 185, 258; Renfrew 1966:40
16	Aphrodisias	good	EB I> EB III	1134	2.5	97.5		yes	Cores and debitage of imported flint and obsidian.	Leurquin 1986; Blackman 1986
12	Bakla Tepe	good	EB I	597	46.0	54.0	yes	yes	presence of one corticated core, defined in an "obsidian atelier" at the outskirts of the settlement	Kolankaya-Bostancı 2006; Kolankaya-Bostancı 2011:154-155; Bigazzi et al. 2008
5	Beşiktepe	very low	EB I	?	-	-	no	no	flint is the vast majority, obsidian only represented by blades	Baykal-Seeher 1996a,:89
31	Çadır Höyük	good	EB I	c.350	23.0	77.0		yes		Steadman et al.2013:141-145, Jeff Geyer pers.comm.
8	Çeşme Bağlararası	low	EB II	300	1-2%	98-99%	no	no	obsidian is rare on site, most of the chipped stone is composed of low quality local materials	Vasıf Şahoğlu pers comm
15	Çine-Tepecik	very low	EB III		-			-		Kolankaya-Bostancı 2011:154
13	Çukuriçi Höyük	good	EB I	c.1000	67.0	33.0	no	yes	presence of decorticated obsidian cores.	Bergner et al. 2009
24	Demircihöyük	good	EB I-EB II	11662	***15.0***	***85.0***	no	yes	High quality flint represents a substantial portion of the assemblage. Presence of small obsidian cores. Most of theobsidian might be of pre-EBA date.	Baykal-Seeher 1996a:7-139
7	Emborio on Chios	good	EB I> EB III	388	4.8	95.2	no	no	no obsidian cores, only blades. Earlier periods show higher ratio of obsidian, with cores and debitage	Bialor 1982:699-713
28	Eti Yokuşu	medium	EB II	30	0.0	100.0	-	-	no obsidian found, though the sample is extremely small	Kansu 1940
23	Hacılartepe	medium	EB I	700	0.0	100.0	-	-	no obsidian	Eimermann 2008:387
14	Iasos	good	EB II	12	67.0	33.0	-	-		Pecorella 1984:98, 109-115; Momigliano 2012:106-112
21	Kaklık Mevkii	medium	EB I	8	0.0	100.0	no	no	only flint is mentioned, but sample is very small	Efe et al.1995:397, fig.27.126-129
29	Kaman Kalehöyük	good	EB III	***298***	***66.1***	***43.9***		yes	the sample represents only the 2002 excavation, from all bronze Age levels (not only EBA). EBA sample (10 pieces) is 100% obsidian.	Koyabashi 2005; Koyabashi and Mochizuki 2002; Koyabashi and Mochizuki 2007
1	Kanlıgeçit	good	EB III	147	4.0	96.0	no	no	obsidian represented only by blades and arrowhead	Özdoğan 2012:232-241
17	Karahisar Höyük	medium	EB III	36	33.0	67.0	no	yes	presence of obsidian cores in substantial quantities	Yayalı-Akdeniz 2002
18	Karataş	good	EB I> EB III	c.200	0.0	100.0	no	no	no obsidian, local materials are dominant	Warner 1994:213
33	Kilisetepe	good	EB I, EB III	32	9.3	91.7	no	yes	presence of one very small (1.7x1.8) decorticated core	Reynolds 2007
25	Küllüoba	low	EB I> EB III	c.500	1-2%	98-99%	no	no	very few obsidian implements were found, in an assemblage dominated by local materials (quartz and chert).	Gatsov and Efe 2005; Murat Türkteki pers.comm.
19	Kuruçay	medium	EB II	18	11.1	88.9	-	-	only 18 pieces in total, 2 obsidian. In the LCh higher proportion of obsidian is higher (16.4%), with presence of cores	Baykal-Seeher 1996b:126-127, 131
20	Kusura	very low	EB I-EB II	?	-	-		yes	Two obsidian cores and obsidian tools are mentioned but statistics are not possible.	Lamb 1937:43-45; Lamb 1938:260
9	Liman Tepe	good	EB II- EB III	104	70.2	29.8	no	yes	Presence of decorticated cores.	Kolankaya-Bostancı 2007; Kolankaya-Bostancı 2008:150, 155; Kolankaya-Bostancı 2011:154-155; Bigazzi et al. 2008
26	Polatlı	medium	EB I> EB III	27	3.7	96.3	-	-	one piece of obsidian, but the sample is extremely small	Lloyd and Gökçe 1951:72
3	Poliochni	good	EB I> EB III	534	8.0	92.0	no	yes	local flint, some obsidian cores, Melos is the supposed source based on visual analysis	Moundrea-Agraphioti 1997
22	Seyitömer Höyük	medium	EB III	30	0.0	100.0	-	-	only flint and other local materials, small sample	Çakalgöz 2000:52
34	Tarsus	good	EB I> EB III	68	17.6	82.4	no	yes	significant amounts of obsidian present in the EBA early, smaller proportions from the later EBA levels. Two obsidian cores are mentioned	Goldman 1956:2552-63
35	Tell Judeideh	good	EB I> EB III	472	16.0	84.0	-	-		Renfrew et al. 1966:60
6	Thermi	low	EB I-EB II	c.100	1.0	99.0	no	no	only one fragment of obsidian, flint cores are also absent	Lamb 1937:178-181
4	Troy	good	EB I> EB III	160	2.5	97.5	no	no	most of the chipped stone (90%) is composed of local chert. Lack of cores for both flint and obsidian.	Gatsov 1998; Pernicka et al.1996
10	Ulucak Höyük	low	EB II	48	c.8-10	c.90-92	?	?	during the Neolithic obsidian ratios are around 20%	Çilingiroğlu et al. 2004:52, Özlem Çevik pers.comm., Marina Milic pers.comm.
2	Yenibademli Höyük	low	EB II	<100	1.0	99.0	no	no	only one fragment of obsidian, most of the chipped stone assemblage is composed of local raw materials (chert)	Gatsov and Karimali 2007:393-394
D	Ayios Stefanos	good	EBA	-	91.0	9.0		yes		Kolankaya-Bostancı 2007:144-146, table 1
G	Dhaskalio Kavos	good	EB II	1554	99.2	0.8	yes	yes	dispersed obsidian working across several trenches, corticated cores (6.7%)	Carter and Milić 2013
E	Knossos	good	EB I>EB III	463	100.0	0.0		yes	presence of cores	Evely 2011
C	Lerna	good	EBA	-	94.0	6.0	yes	yes	presence of obsidian workshop, corticated cores	Kolankaya-Bostancı 2007:144-146, table 1
B	Lithares	good	EBA	-	94.2	5.8	yes	yes	presence of obsidian workshop, corticated cores	Kolankaya-Bostancı 2007:144-146, table 1
A	Manika	good	EBA	-	96.3	3.7	yes	yes	presence of obsidian workshop, corticated cores	Kolankaya-Bostancı 2007:144-146, table 1
F	Myrtos	good	EB II	181	100.0	0.0	yes	yes	presence of obsidian workshop, corticated cores	Jarman 1972

Figure 6.1 Summary table showing data from analysed Anatolian (nos. 1-35) and western Aegean sites (nos. A-G). The column “Map No.” refers to site numbers on maps, “Detail” refers to the degree of detail in published reports, “Total sample” refers to the total amount of analyzed chipped stone assemblage, “Chipped stone: obsidian” and “Chipped stone: other” refers to percentages of obsidian vs. other materials in the lithic assemblage, “Obsidian cores” refers to presence/absence of corticated or decorticated cores on site. NB: percentage values for Demircihöyük may refer partly to pre-EBA materials surfaced in EBA contexts, while values for Kaman Kalehöyük refer to ‘Bronze Age levels’ and not specifically EBA assemblages.

Map No.	Site name	Obsidian provenance analysis					Obsidian ratios (% of total lithic)		Distance from sources		Notes	Reference
		Method	Sample size	Melos	c. Anatolia	Other	Melos	c.Anatolia	Melos	c.Anatolia		
30	Alacahöyük	Optical spectrography	1	-	100%	-	-	-	-	230	sample is a stray piece from surface	Renfrew et al.1966
32	Alişar Höyük	Optical spectrography	3	-	100%	-	-	-	-	230	samples are stray pieces from surface	Renfrew et al.1966
16	Aphrodisias	INAA	***20***	***65%***	***35%***	-	-	-	430	595	Provenance analysis only for LCh obsidian	Blackman 1986
12	Bakla Tepe	visual+INAA+FT	***17***	***82.4%***	***17.6%***	-	37.8%	8.2%	370	730	LCh and EB I samples not distinguished in the publication	Bigazzi et al.2008
5	Beşiktepe	INAA	***3***	***67%***	***33%***	-	-	-	620	780	Provenance analysis only for LCh obsidian	Pernicka et al.1996
31	Çadır Höyük	visual+XRF	unk	-	mostly	1 eastern Anatolia	-	-	-	215		Steadman et al.2013
15	Çine-Tepecik	XRF	unk	mostly	-	some Yali	-	-	380	-	obsidian from Yali (study currently unpublished)	Kolankaya-Bostancı 2011:154
13	Çukuriçi Höyük	INAA	34	91.2%	8.8%	-	61.1%	5.9%	328	690	Central Anatolian obsidian does not occur on site before the EB I	Bergner et al.2009
G	Dhaskalio Kavos	visual	1541	99.6%	0.3%	Yali: 0.1%	98.8%		110	910		Carter and Milić 2013
24	Demircihöyük	FT	4	-	-	Unknown 100%	-	-	-	-	Unknown local source	Wagner and Weiner 1987
14	Iasos	visual+XRF	3	67%	33%	some Yali	44.6%	22.4%	284	730	Yali blades come frome the cemetery	Momigliano 2012
29	Kaman Kalehöyük	XRF	105	-	100%	-	-	66-100%	-	145		Kobayashi and Mochizuki 2002
1	Kanlıgeçit	visual	6	-	100%	-	-	4%	-	830		Özdoğan 2012:232
E	Knossos	visual	485	97.1	2.9	-	97.1	2.9	270	1130		Evely 2011
9	Liman Tepe	visual+INAA+FT	80	56.2%	43.8%	-	39.4%	30.7%	405	750		Bigazzi et al.2008
3	Poliochni	visual	43	100%	-	-	8%	-	670	-		Moundrea-Agraphiotis 1997:194
35	Tell Judeideh	Optical spectrography	1	-	100%	-	-	-	-	360		Renfrew et al.1966
4	Troy	INAA	16	75%	25%	-	1.9%	0.6%	640	770		Pernicka et al.1996
10	Ulucak Höyük	XRF	?	mostly	some	some Yali	-	-	425	690		Çilingiroğlu et al.2004:52; Marina Milić pers.comm.

Figure 6.2 Summary table of published provenance analysis data. "Map No." refers to site numbers on maps, "Method" refers to the method employed for the analysis (INAA= Instrumental Neutron Activation Analysis, FT= Fission Track dating, XRF=X-Ray Fluorescence Spectrometry), "Sample size" refers to the number of analyzed samples, "Obsidian ratios" indicates the estimated ratio of obsidian from Melos or Göllü/Nenezi Dağ out of the total chipped stone assemblage, "Distance from sources" refers to travelled distance of each site from obsidian sources (calculated on the basis of proposed EBA routes, cf. sections 3.5 and 3.6).

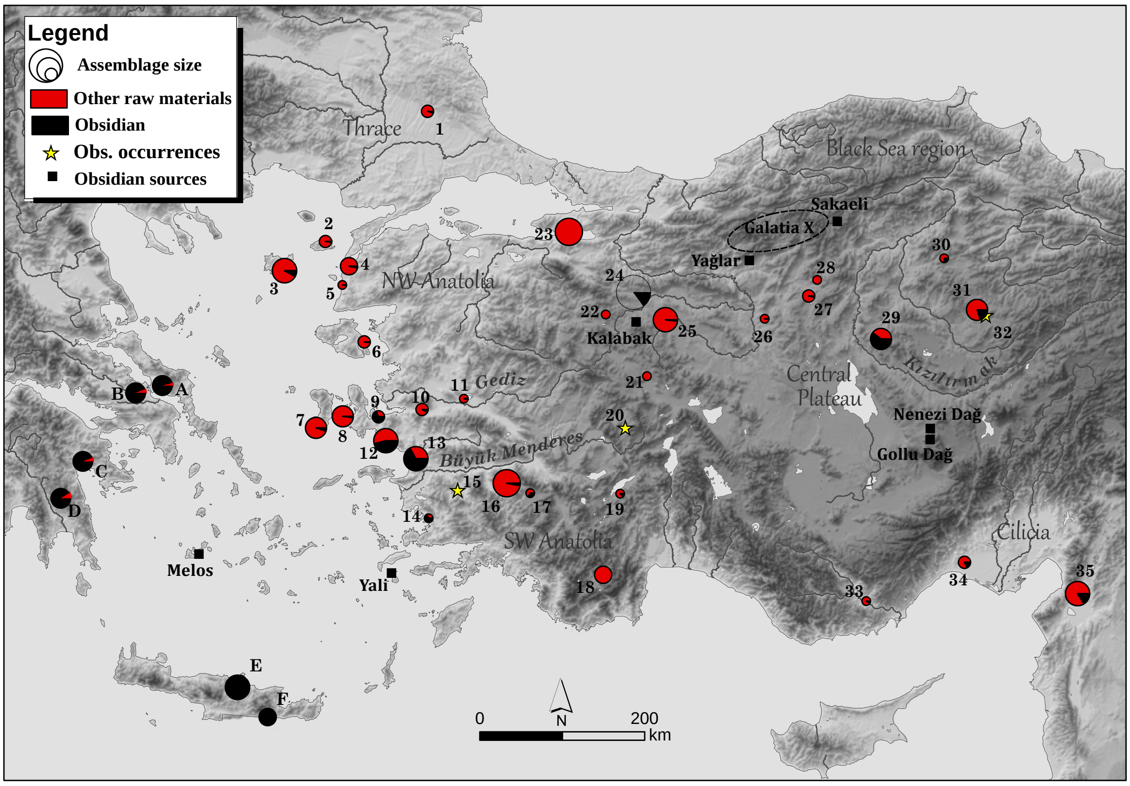


Figure 6.3 Map showing the proportion of obsidian vs. other materials at analysed EBA sites in the Aegean and Anatolia, with location of main known obsidian sources (data on sources from Poidevin 1998). Symbol size reflects the size of the chipped stone assemblage (from c.30 pieces to 12,000). Site numbers refer to table in figure 6.1. NB: Demircihöyük's EBA lithic assemblage is in part mixed with Chalcolithic materials (Baykal-Seeher 1996a:330), thus the proportions of obsidian cannot safely established, and is marked with a transparent symbol.

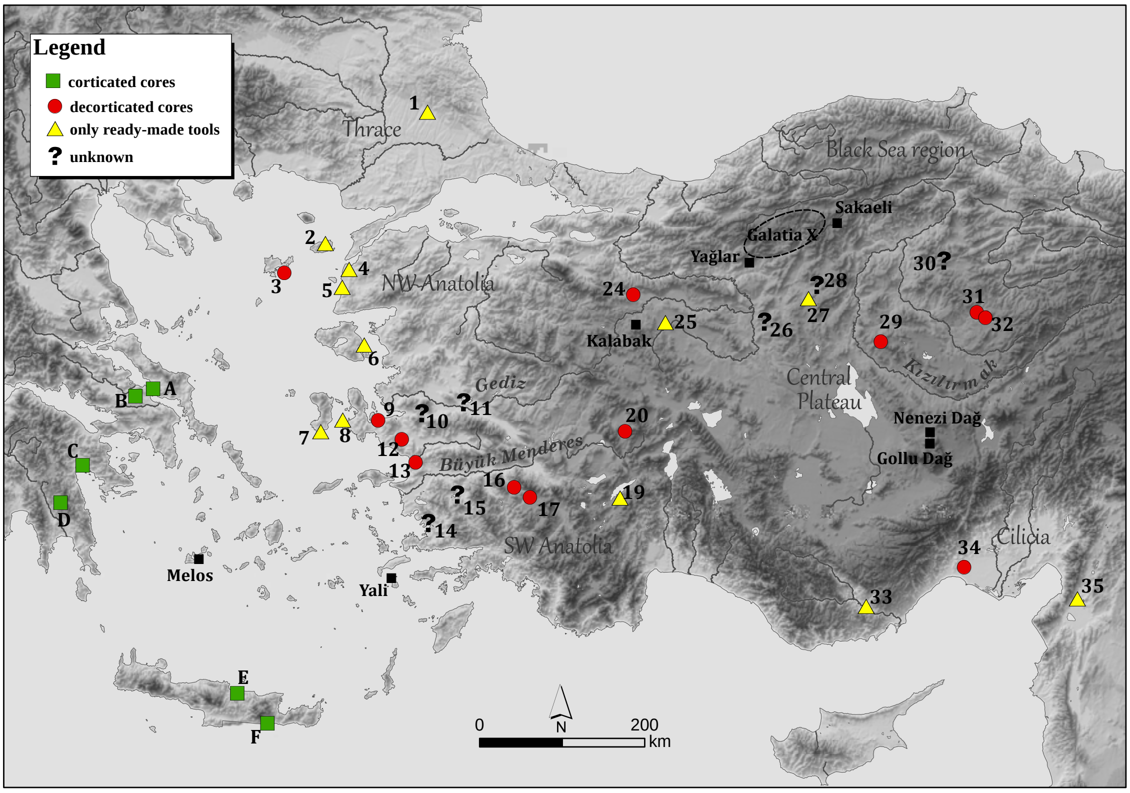


Figure 6.4 Map showing the presence/absence of obsidian cortical cores, decorticated cores or only ready-made products at analyzed EBA sites in the Aegean and Anatolia. Site numbers refer to table in figure 6.1.

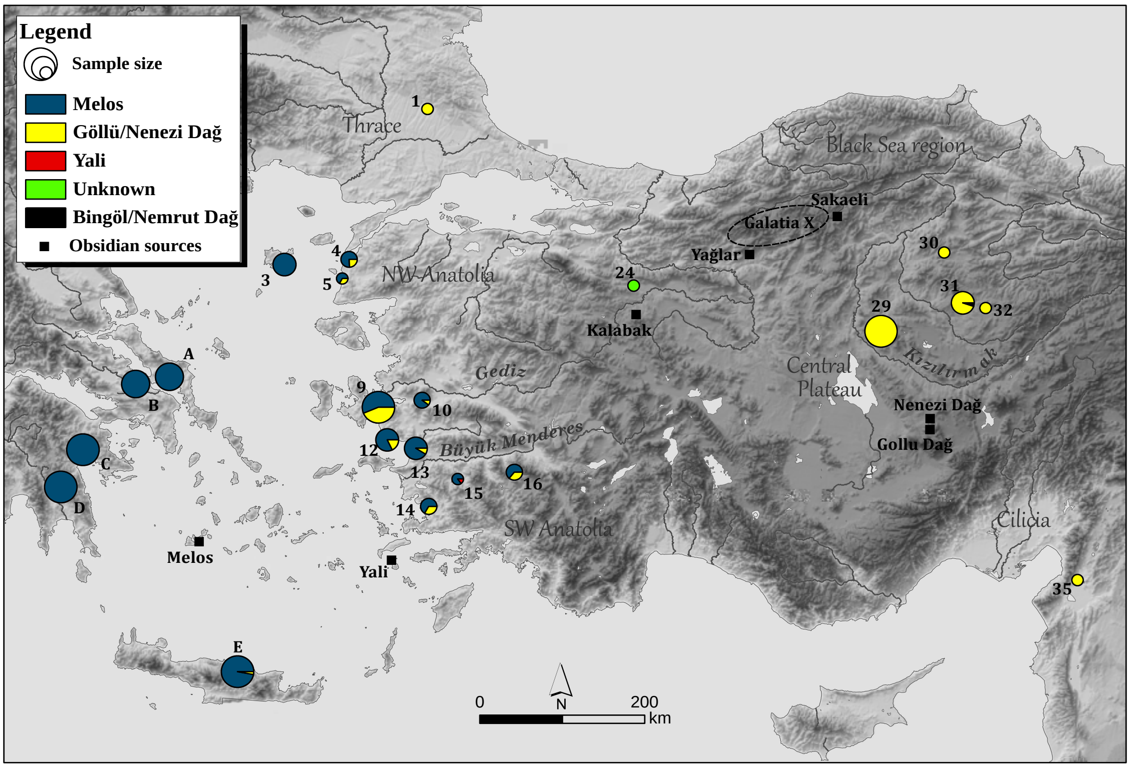


Figure 6.5 Map showing the proportion of obsidian of different sources at analysed EBA sites in the Aegean and Anatolia, with location of main known obsidian sources. Symbol size reflects the total amount of obsidian samples analysed for provenance analysis (from 1 to 105 pieces). Site numbers refer to table in figure 6.2.

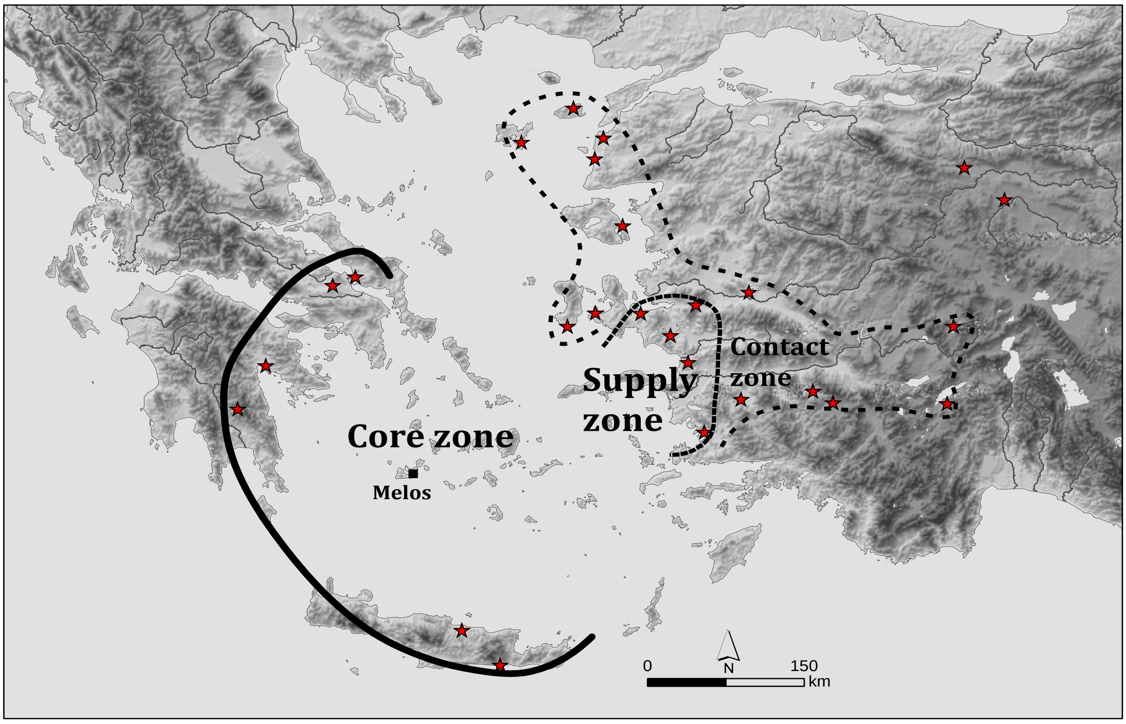


Figure 6.6 Map showing the extent of core, supply and contact zones in the Melian obsidian exchange network during the Early Bronze Age.

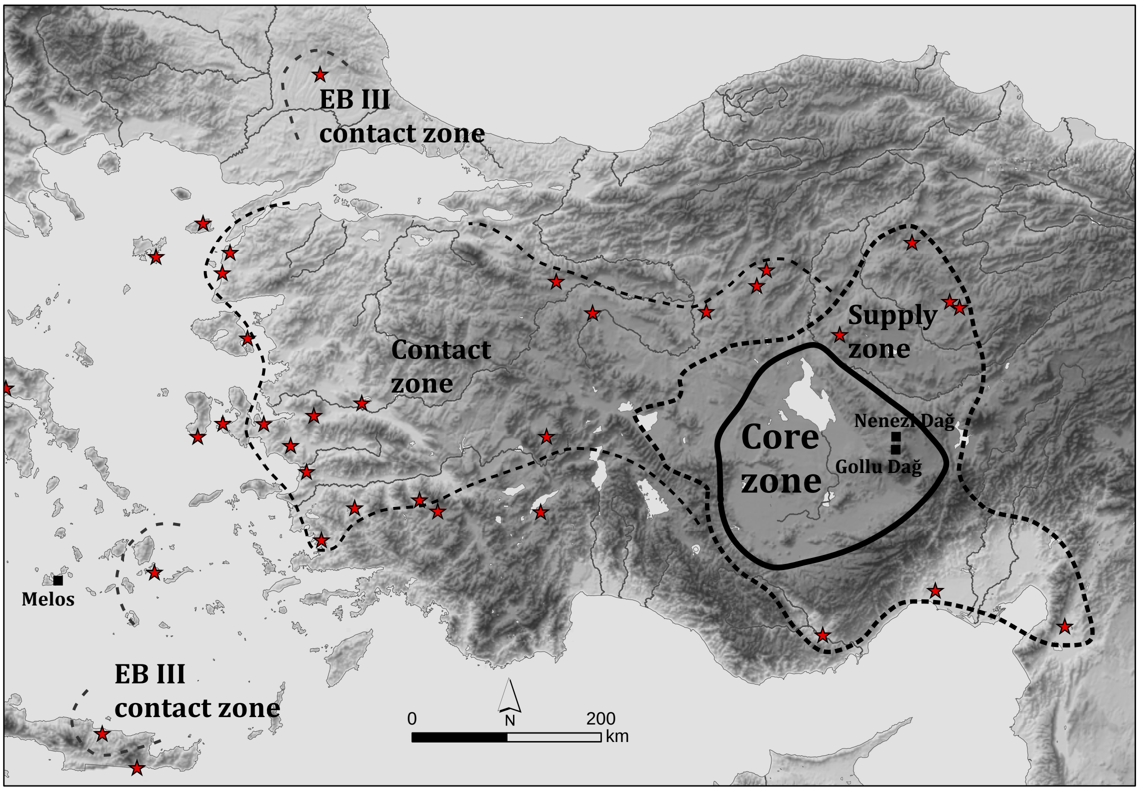


Figure 6.7 Map showing the extent of core, supply and contact zone in the Göllü/Nenezi Dağ network during the Early Bronze Age. Note that the GND contact zone expands westwards during the late EBA period (marked on the map).

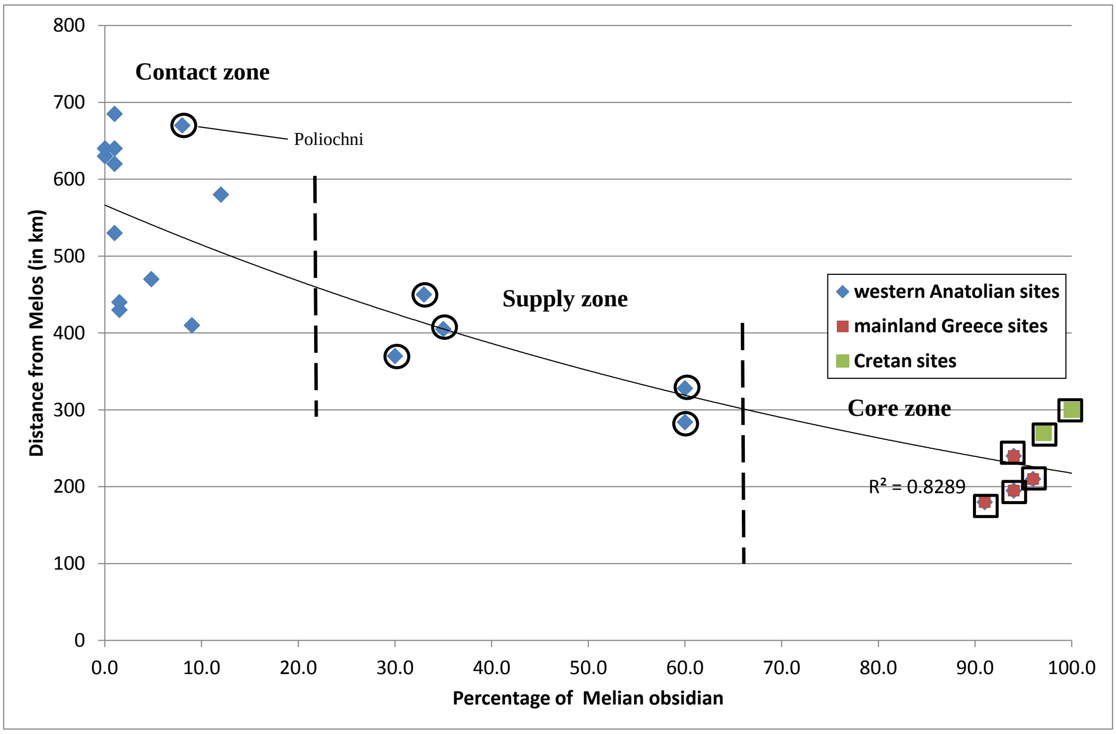


Figure 6.8 Graph showing the inverse exponential correlation between obsidian ratios at each site and its estimated distance from sources in the Melian network. Black square indicate presence of cortical nuclei, black circles the occurrence of decorticated cores on site.

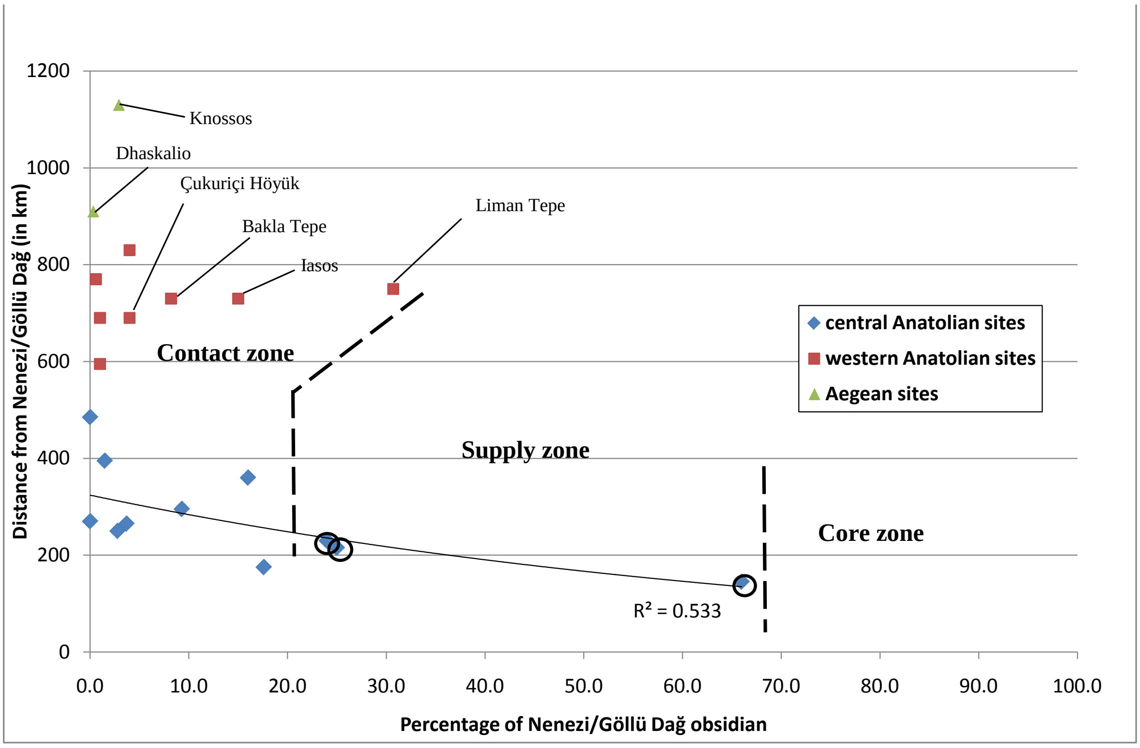


Figure 6.9 Graph showing the inverse exponential correlation between obsidian ratios at each site and its estimated distance from sources in the Göllü/Nenezi Dağ network. Black circles indicate presence of decorticated cores on site.

	Proportions of obsidian			
Site Name	**Neolithic**	**Chalcolithic**	**LCh**	**EBA**
Ulucak Höyük	c.20%			c.10%
Aphrodisias			9%	2.5%
Çukuriçi Höyük			72%	67%
Kuruçay			16.5%	11%
Emporio		28%		4.8%

Figure 6.10 Table showing the relative proportions of obsidian in the total chipped stone assemblages in different periods, at the same five sites in western Anatolia and eastern Aegean.

Network	**Core zone**	**Supply zone**	**Contact zone**
	in km	***in km***	***in km***
Melos	up to 250km	up to 400km	up to 650km
East Göllü Dağ/Nenezi Dağ	up to 150km	up to 250km	up to 1150km
	in days of travel	***in days of travel***	***in days of travel***
Melos	up to 6-8 days	up to 12-14 days	up to 15-20 days
East Göllü Dağ/Nenezi Dağ	up to 6-8 days	up to 12-14 days	up to 50-60 days

Figure 6.11 Table showing the extent of core, supply and contact zones in the Melian and EGD/ND networks. The estimated travel times, as reconstructed in chapter 3 (by longboat in the case of the Melian network, by human porter in the case of the EGD/ND network) are also shown for comparison.

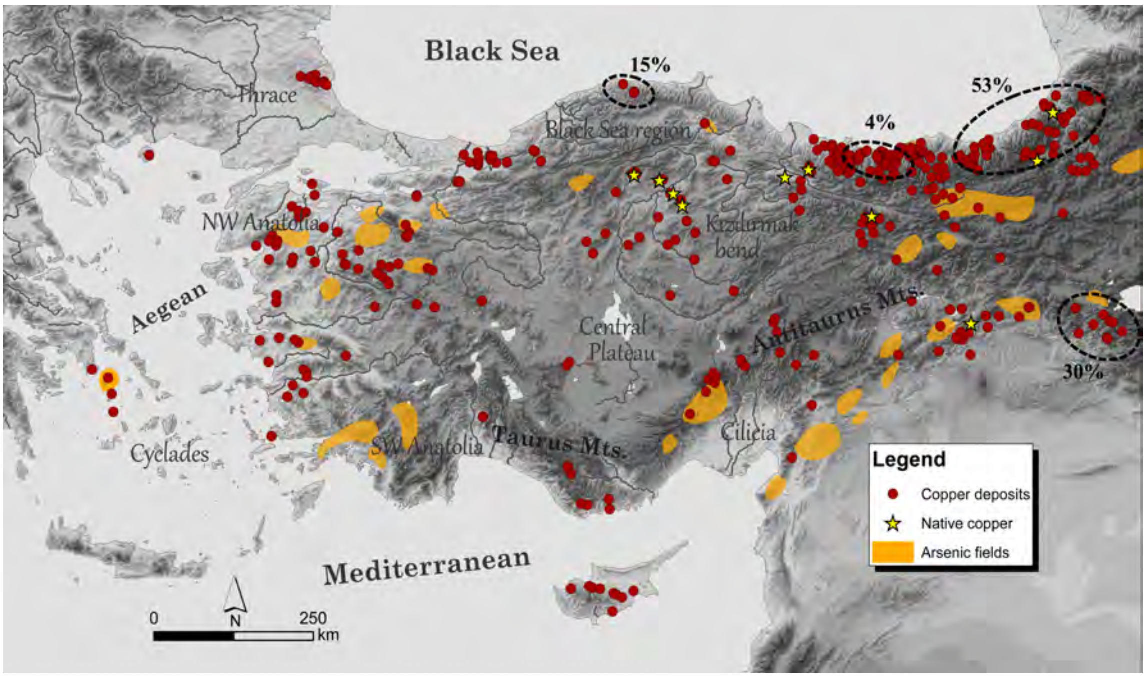


Figure 6.12 Map showing the location of known copper deposits in Anatolia and surrounding regions, the occurrence of arsenic-rich mineral ores and the potential copper prehistoric mines. Dotted circles and percentages refer to the proportion of present-day copper reserves as estimated by the General Directorate for Mineral Research in Turkey (cf. figure 6.16).

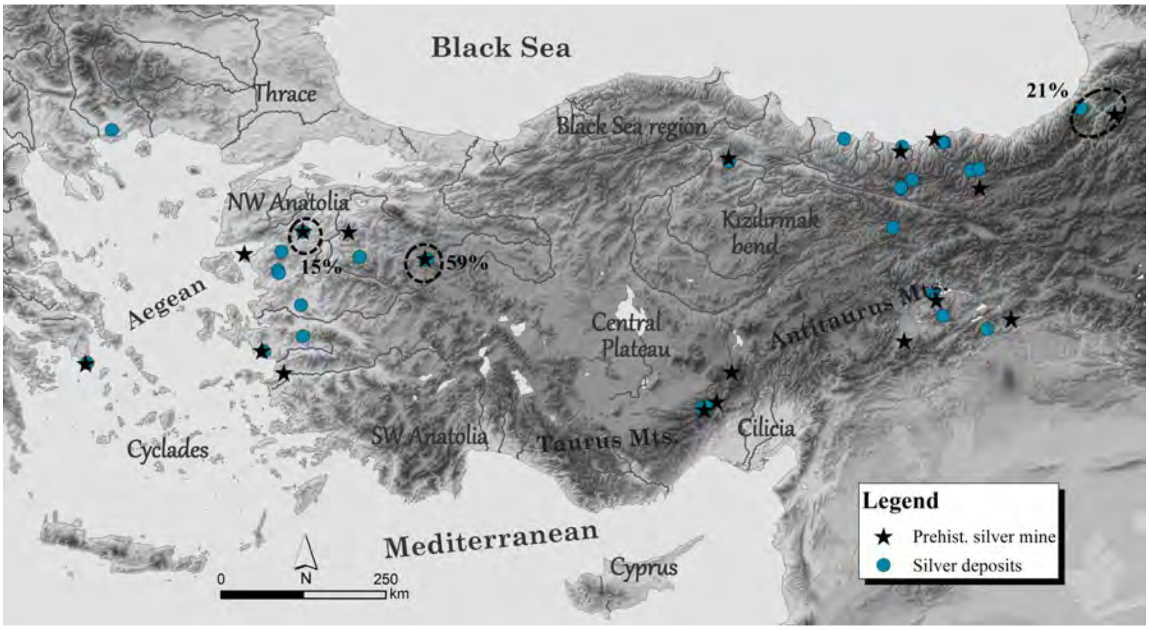


Figure 6.13 Map showing the location of known silver deposits in Anatolia and surrounding regions and the potential silver prehistoric mines. Dotted circles and percentages refer to the proportion of present-day silver reserves as estimated by the General Directorate for Mineral Research in Turkey (cf. Figure 6.16).

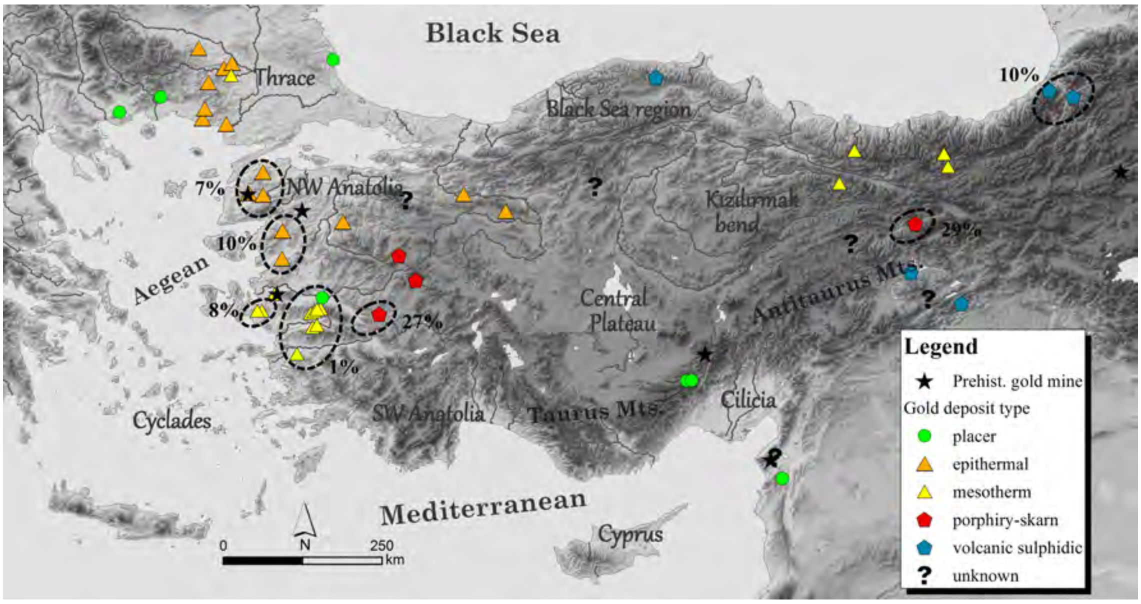


Figure 6.14 Map showing the location and typology of known gold deposits in Anatolia and surrounding regions and the potential gold prehistoric mines. Dotted circles and percentages refer to the proportion of present-day gold reserves as estimated by the General Directorate for Mineral Research in Turkey (cf. figure 6.16).

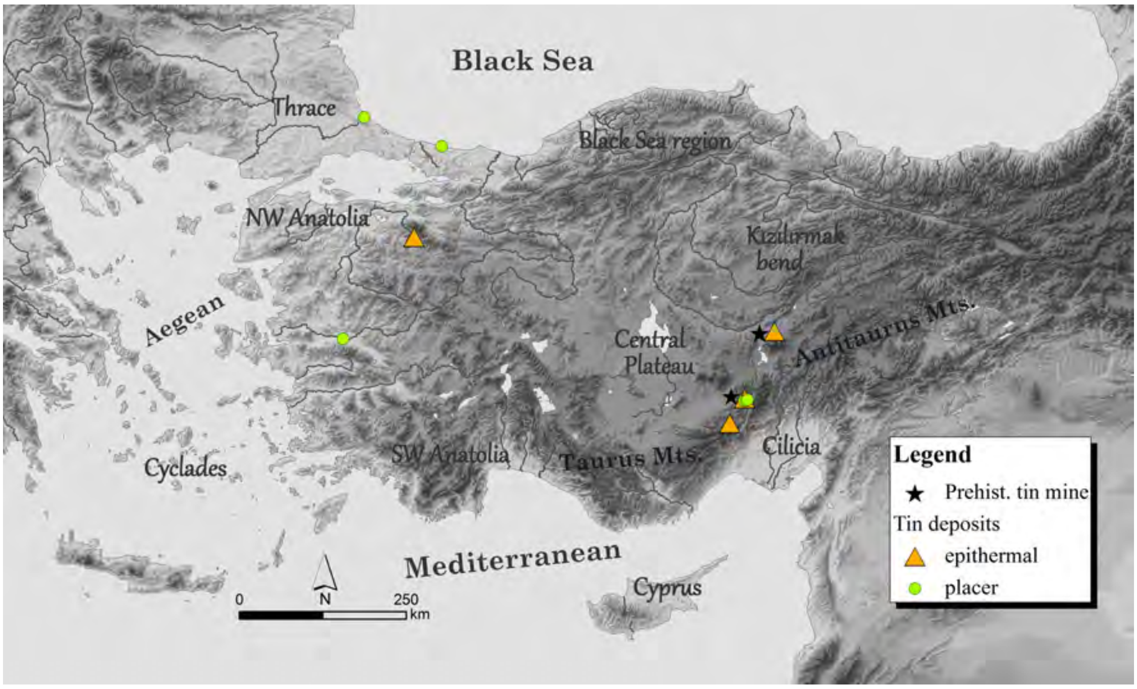


Figure 6.15 Map showing the location and typology of known tin deposits in Anatolia, and the potential tin prehistoric mines.

Mine name	Location	Metal	Grade (per ton)	Est. quantity (ton)	% of total Turkey	Reference
Ovacık	İzmir-Bergama	Ag	11gr	33	0.5	MTA 2001b
Küçükdere	Balıkesir-Havran	Ag	11.8gr	17	0.3	MTA 2001b
Kaymaz	Eskişehir-Sivrihisar	Ag	5.3gr	5	0.1	MTA 2001b
Cerattepe	Artvin	Ag	145gr	1245	19.2	MTA 2001b
Akarsen	Artvin-Borçka	Ag	28gr	18	0.3	MTA 2001b
Altınoluk	Balıkesir-Edremit	Ag	25gr	6	0.1	MTA 2001b
Arapdağı	İzmir-Karşıyaka	Ag	48gr	6	0.1	MTA 2001b
Altıntepe	Izmir-Karşıyaka	Ag	42gr	15	0.2	MTA 2001b
Gümüşköy	Kühtaya-Merkez	Ag	180gr	3827	59.1	MTA 2001b
Bolkardağ	Niğde-Ulukışla	Ag	140-335gr	116	1.8	MTA 2001b
Akoluk	Ordu-Ulubey	Ag	12gr	8	0.1	MTA 2001b
Aktepe	Sivas-Irmanlı	Ag	103gr	51	0.8	MTA 2001b
Murgul	Artvin	Ag	219gr	127	2.0	MTA 2001a
Gümüldür	İzmir-Seferihisar	Ag	250-540gr	31	0.5	Legeranlı 2008, 357
Balya Maden	Balıkesir-Edremit	Ag	?	1000	15.4	Wagner and Öztunalı 2000, 35
Ovacık	İzmir-Bergama	Au	9gr	27	7.02	MTA 2001b
Efemçukuru	İzmir-Seferihisar	Au	12.6gr	32	8.31	MTA 2001b
Kışladağ	Uşak-Eşme	Au	1.4gr	106	27.54	MTA 2001b
Küçükdere	Balıkesir-Havran	Au	6.4gr	9	2.34	MTA 2001b
Kaymaz	Eskişehir-Sivrihisar	Au	6gr	15	3.90	MTA 2001b
Mastra	Gümüşhane-Mescitli	Au	12gr	12	3.12	MTA 2001b
Akbaba	Çanakkale-Kirazlı	Au	12.5gr	10	2.60	MTA 2001b
Kartaldağ	Çanakkale-Kirazlı	Au	5.2gr	0.3	0.07	MTA 2010
Şahinli-Lapsek	Çanakkale-Kirazlı	Au	5.76	16	4.16	MTA 2010
Cerattepe	Artvin	Au	4gr	37	9.61	MTA 2001b
Balya Maden	Balıkesir-Edremit	Au	?	3	0.78	Wagner and Öztunalı 2000, 35
Çöpler	Erzincan-Ilıç	Au	3gr	112	29.10	MTA 2001b
Sart	Manisa-Salihli	Au	?	1.9	0.49	MTA 2001b
Geyikdağı	İzmir	Au	1.49gr	0.7	0.18	Legeranlı 2008, 358
Boğazyayla	İzmir	Au	2.24gr	0.1	0.03	Legeranlı 2008, 358
Yediler tepe	İzmir	Au	1.02gr	0.1	0.03	Legeranlı 2008, 358
Zeytinlik	İzmir	Au	10.7gr	0.01	0.00	Legeranlı 2008, 358
Ödemiş	İzmir	Au	5gr	0.2	0.05	Legeranlı 2008, 358
Tire	İzmir-Beylerdere	Au	26.3gr	?		Legeranlı 2008, 358
Çilektepe	İzmir-Karşıyaka	Au	1.2gr	2.6	0.68	Legeranlı 2008, 358
Murgul	Artvin	Cu	22kg	92000	5.5	MTA 2001a
Cerattepe	Artvin	Cu	52kg	202000	12.0	MTA 2001a
Şeyitler	Artvin	Cu	14kg	34000	2.0	MTA 2001a
Arapuçuran	Çanakkale	Cu	12kg	15000	0.9	MTA 2001a
Ergani Maden	Elaziğ	Cu	240kg	12000	0.7	MTA 2001a
Giresun	region	Cu	19-24kg	65000	3.9	MTA 2001a
Küre	Kastamonu	Cu	20kg	252000	15.0	MTA 2001a
Madenköy	Rize	Cu	46kg	505200	30.0	MTA 2001a
Siirt	region	Cu	17-30kg	430000	25.5	MTA 2001a
Aktepe	Sivas-Irmanlı	Cu	?	16000	1.0	MTA 2001a
Trabzon	region	Cu	11-27kg	60000	3.6	MTA 2001a

Figure 6.16 Summary table of the main modern copper, silver and gold reserves in Turkey, with information regarding grade within the mine (i.e. ratio between gangue and metal), the estimated quantity of metal in the deposit, and the proportion between the metal reserve at each site compared to the estimated overall reserves in Turkey.

Map No.	Locality	District	Region	Metal	Evidence for mining	Evidence for smelting	Native Cu	As-rich ore	Slag	Reference
29	Alihoca	Ulukışla	Niğde	Copper	preH/new	Cu.Pb: preH/ new		x	x	Wagner and Öztunalı 2000
14	Arap Dağı	Karşıkaya	İzmir	Gold	preH/med/new				x	Wagner and Öztunalı 2000
26	Bakır Dağı	Felahiye	Kayseri	Copper	preH	Cu: preH			x	Wagner and Öztunalı 2000
13	Bakırlı	Sandıklı	Afyon	Copper	preH/new	Cu: preH			x	Wagner and Öztunalı 2000
6	Balya	Edremit	Balıkesir	Copper/ Silver/ Gold	preH/hell/ byz/ ott/new	Pb: hell/rom/new		x	x	Wagner and Öztunalı 2000
30	Bolkardağ	Ulukışla	Niğde	Copper/ Silver	preH/rom/new	Pb-Ag: preH/ rom/med		x	x	Wagner and Öztunalı 2000
22	Çağşak	Çorum	Çorum	Copper	preH/new	Cu: preH				Wagner and Öztunalı 2000
43	Camlı	Suşehri	Sivas	Copper	preH	Cu: preH/ ott	x		x	Wagner and Öztunalı 2000
23	Çamlıbel Tarlası	Boğazköy	Ankara	Copper		Cu: preH				Schoop 2011a
21	Derealan	Merzifon	Amasya	Copper	preH	Cu: hell/rom			x	Wagner and Öztunalı 2000
1	Dereköy	Kırklareli	Kırklareli	Copper	preH/rom/ ott	Cu: rom/med			x	Wagner and Öztunalı 2000
18	Derekutuğun	Bayat	Çorum	Copper	preH/new	Cu: preH/class	x			Wagner and Öztunalı 2000
4	Doğancılar	Çan	Çanakkale	Copper	preH/class/new	Cu: class			x	Wagner and Öztunalı 2000
55	Ergani Maden	Maden	Elaziğ	Copper/ Silver	preH/rec	Cu: old/new	x		x	Wagner and Öztunalı 2000
42	Gölcük	Koyulhisar	Sivas	Copper	preH/new	Cu: preH/new			x	Wagner and Öztunalı 2000
53	Görgüköy (Cafana)	Yeşilyurt	Malatya	Silver	preH/ott/rec					Wagner and Öztunalı 2000
15	Gümüldür	?	İzmir	Silver	preH					Yener 1983, 8
16	Gümüş	?	Aydın	Silver	preH					Yener 1983, 15
20	Gümüş	Gümüşhacıköy	Amasya	Silver	preH/hell/med	Pb: preH/new			x	Wagner and Öztunalı 2000
41	Gümüşhane	Gümüşhane	Gümüşhane	Silver	preH/rom/med/ ott/new	Pb-Ag, Cu: old			x	Wagner and Öztunalı 2000
49	Gümüşhaneköy	Ardanuç	Artvin	Copper/ Silver	preH/new	Cu: preH/ new			x	Wagner and Öztunalı 2000
11	Gümüşköy	Tavşanlı	Kütahya	Copper/ Silver	preH/rom/ byz/ ott/new	Pb: class		x	x	Wagner and Öztunalı 2000
35	Gürgülöğlu	Bulancak	Giresun	Silver	preH					Wagner and Öztunalı 2000
25	Hisarcık	?	Kayseri	Tin	preH	Sn: preH				Yalçın and Özbal 2009
2	İkiztepe	Demirköy	Kırklareli	Copper	preH/rom/ ott/new	Cu: rom/ott			x	Wagner and Öztunalı 2000
48	Ilıcaçermik	Borçka	Artvin	Copper		Cu: preH/ med			x	Wagner and Öztunalı 2000
50	Kakikkaya	Karakurt	Kars	Gold	preH/new					Wagner and Öztunalı 2000
40	Karadağ (Artabil)	Torul	Gümüşhane	Copper	preH/ott/ new	Cu: preH/ ott/new			x	Wagner and Öztunalı 2000
3	Kartaldağ (Astyra)	Lapseki	Çanakkale	Gold	preH/class/byz/new					Wagner and Öztunalı 2000
52	Keban	Elaziğ	Elaziğ	Copper/ Silver	preH/med/ott/new	Pb/Cu: old/new			x	Wagner and Öztunalı 2000
9	Keles	Bursa	Bursa	Copper	preH/rom/new	Cu: old			x	Wagner and Öztunalı 2000
28	Kestel	Çamardı	Niğde	Gold	preH/byz	Sn/Au: preH				Yener 2000
33	Kisecik	Hatay	Hatay	Copper/ Gold	preH/rom/new			x		Kuruçayırlı and Özbal 2005
38	Köprübaşı	Tirebolu	Giresun	Copper/ Silver	preH/hell/rom/rec	Cu, Pb-Ag: preH/hell/rom		x	x	Wagner and Öztunalı 2000
34	Kozlu	Erbaa	Tokat	Copper	preH	Cu: preH	x		x	Wagner and Öztunalı 2000
19	Küre	Kastamonou	Kastamonou	Copper	preH/ott/rec	Cu: med/ott			x	Wagner and Öztunalı 2000
39	Kürtün	Torul	Gümüşhane	Copper	preH/ott/ new	Cu: old			x	Wagner and Öztunalı 2000
7	Maden Adası	?	Balıkesir	Silver	preH					Pernicka et al. 2003:155
44	Madenköy	Hafik	Sivas	Copper	preH/new	Cu: preH/ ott			x	Wagner and Öztunalı 2000
46	Madenlı (Latum)	Çayeli	Rize	Copper	old/med/rec	Cu: preH/ new			x	Wagner and Öztunalı 2000
45	Maltepeköy (Hornovil)	Divriğı	Sivas	Copper		Fe, Cu: preH			x	Wagner and Öztunalı 2000
51	Mamlis	Ovacık	Tunceli	Copper	preH/new	Pb: preH/ new, Cu?				Wagner and Öztunalı 2000
24	Menteşe	Felahiye	Kayseri	Copper	preH					Wagner and Öztunalı 2000
47	Murgul	Borçka	Artvin	Copper	preH/hell/new	hell/med	x		x	Wagner and Öztunalı 2000
31	Ömerliköy	Pozantı	Adana	Silver	preH/new				x	Wagner and Öztunalı 2000
27	Pınarbaşı Boğaz	Çamardı	Niğde	Silver	preH/byz/rec	Pb: hell/rom/med			x	Wagner and Öztunalı 2000
56	Pirajman (Kurşunlu)	Dicle	Diyarbakır	Silver	preH/med/new	Pb-Ag: old/ med/new			x	Wagner and Öztunalı 2000
54	Polusağı	Pötürge	Malatya	Copper	new	Cu: preH/ new			x	Wagner and Öztunalı 2000
37	Seğizlik	Tirebolu	Giresun	Copper		Cu: preH			x	Wagner and Öztunalı 2000
8	Serceörenköy	Kepsut	Balıkesir	Copper/ Silver	preH/hell/med/new	Cu: rom			x	Wagner and Öztunalı 2000
32	Süğüt	Hassa	Hatay	Copper	preH/new					Wagner and Öztunalı 2000
10	Tahtaköprü	Inegöl	Bursa	Copper	preH/rom	Cu: old			x	Wagner and Öztunalı 2000
36	Tekmezar	Bulancak	Giresun	Copper	new	Cu: preH/ rom/ byz/med			x	Wagner and Öztunalı 2000
12	Tepecik	Tavşanlı	Kütahya	Copper		Cu: preH			x	Efe 2002:53-54
17	Tohumlar	Bala	Ankara	Copper		Cu: preH			x	Wagner and Öztunalı 2000
5	Yuvalar	Çan	Çanakkale	Copper	preH/rom/med	Cu: preH/rom/ med			x	Wagner and Öztunalı 2000

Figure 6.17 Summary table of potential prehistoric mines in Anatolia, with information regarding the location, the suggested metals targeted for the extraction, the evidence of prehistoric mining and smelting, and the presence of native copper, arsenic-rich minerals and slag. "Map no." refers to numbers in map 6.18.

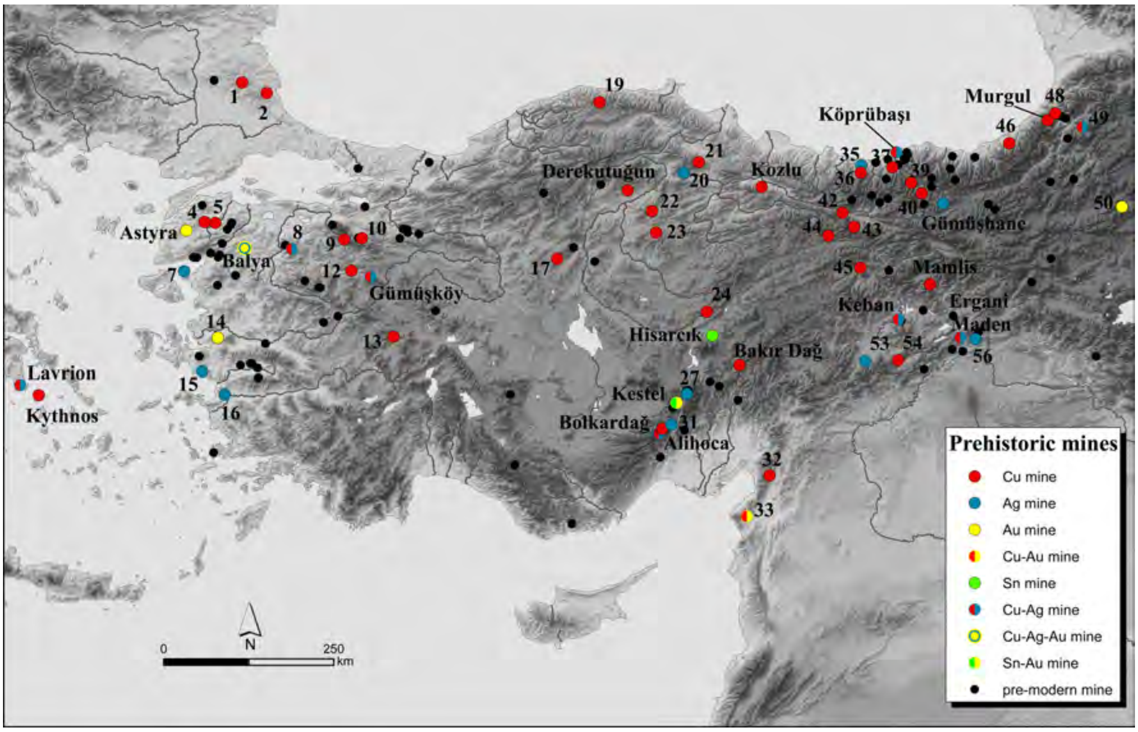


Figure 6.18 Map showing the location of c.150 "old workings" (pre-modern mines) and the c.60 potential prehistoric mines catalogued by the Heidelberg team (data from MTA reports and from figure 6.17).

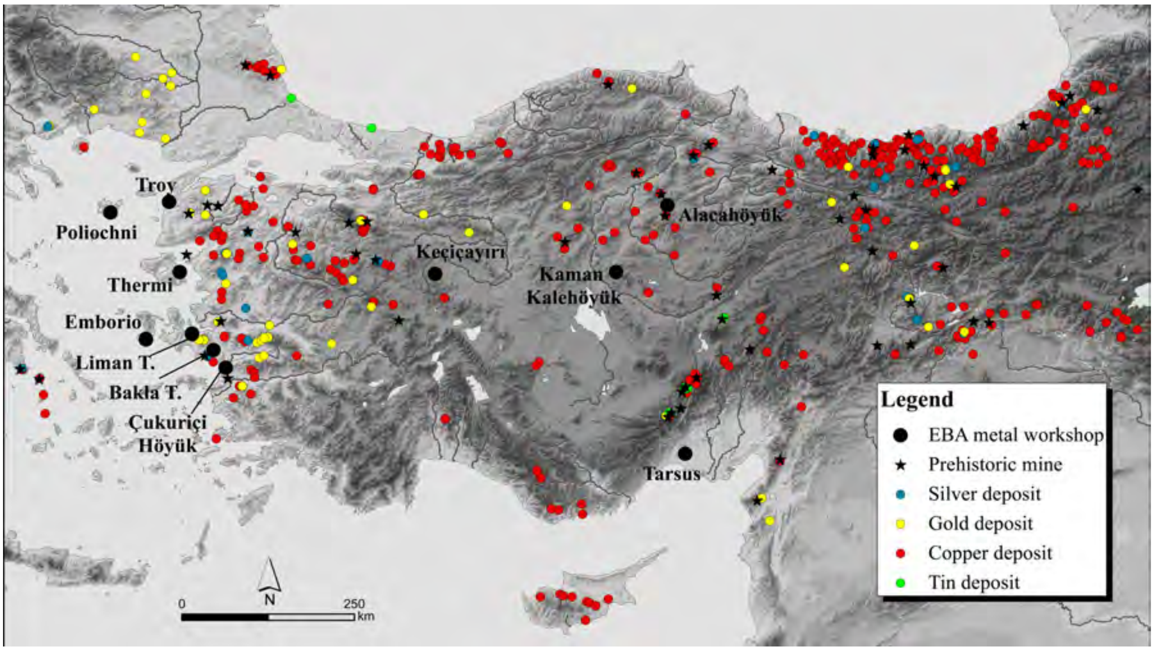


Figure 6.19 Map showing the location of known Early Bronze Age intra-site metallurgical workshops, compared to that of known metal ores and potential prehistoric mines.

Site	Phase	Period	Slag	Crucible	Tuyere	Mould	Ingot mould	Other	Context	Notes	Reference
Limantepe	VII	LCh	6	2						14 metal objects from the burnt level	Keskin 2009:105-106
Limantepe	VI	EB I	2	x	x	8	1	a bowl furnace, ore-/slag-crushing devices	houses 2 and 3		Keskin 2009:99, 106-109
Limantepe	V	EB II	11			x	1	a lump of malachite	houses 2 and 3		Keskin 2009:109-112
Limantepe	IV	EB III	5								Keskin 2009:112
Bakla Tepe	V	LCh	78	5	1			ore-/slag-crushin devices	no architectural remains were associated with the large amount of slag, but quite a small trench	66 copper objects and one silver ring from the burnt level	Keskin 2009:113-118
Bakla Tepe	IV	EB I	50	x		x	1				Keskin 2009:118-120
Poliochni	Blue	EB I	13	x	x	x		lost-wax clay mould	megaron 832 has slag, crucible, tuyere, metallurgical activities also in megaron 605 (with lost-wax mould for axe, and a tuyere) and insulae I-II, and near fortification walls		Kouka 2002:63-64
Poliochni	Green	EB II		x	x	x			megara 832 (mould for dagger) and 605, rooms 863 and 1109		Kouka 2002:75-77
Poliochni	Red	EB II		x	x			Hoard of 19 Cu-alloy artefacts in room 829 associated with megaron 832	megara 832 (founder's hoard) and 605		Kouka 2002:92-95
Poliochni	Yellow	EB III	3	2	x				rooms 424, 502, 609 (associated to megaron 605)		Kouka 2002:115-119
Thermi	I	EB I		2		2			area E-N and Γ3		Kouka 2002:169
Thermi	II	EB I		1	1	1			area K18, E, and NΛ5		Kouka 2002:179-181
Thermi	III	EB II		3	1				area K7, Λ		Kouka 2002:193, 202
Thermi	IVA	EB II		3	2				area E-N, Π, P		Kouka 2002:210-211
Thermi	IVB	EB II		2		1		"Potter's Pool" hoard of 6 artefacts outside settlement	area E, Z/P4		Kouka 2002:223-224
Thermi	V	EB II		2	1				area Z and Λ		Kouka 2002:223-224
Keçiçayırı		EB II			7	2			most of the metallurgical tools were found in the same room		Efe et al.2011:15, figure 15
Emborio	V-IV	EB I		2		1					Kouka 2002:262, 266
Troy	I-IV	EB I-III		7 (37)	2 (23)	44	x			numbers in brackets indicate unstratified finds	Blegen et al.1950; Schliemann 1881; Schmidt 1902
Çukuriçi Höyük	III	EB I	x	x		1	1	ore-/slag-crushin devices, metallurgical oven (?), casting debris	rooms 1 (tool storage) and 2 (work station)		Horejs 2009; Horejs et al.2010; Horejs and Mehofer 2015

Figure 6.20 Summary table of the evidence for Late Chalcolithic and Early Bronze Age intra-site metallurgical workshops in western and central Anatolia.

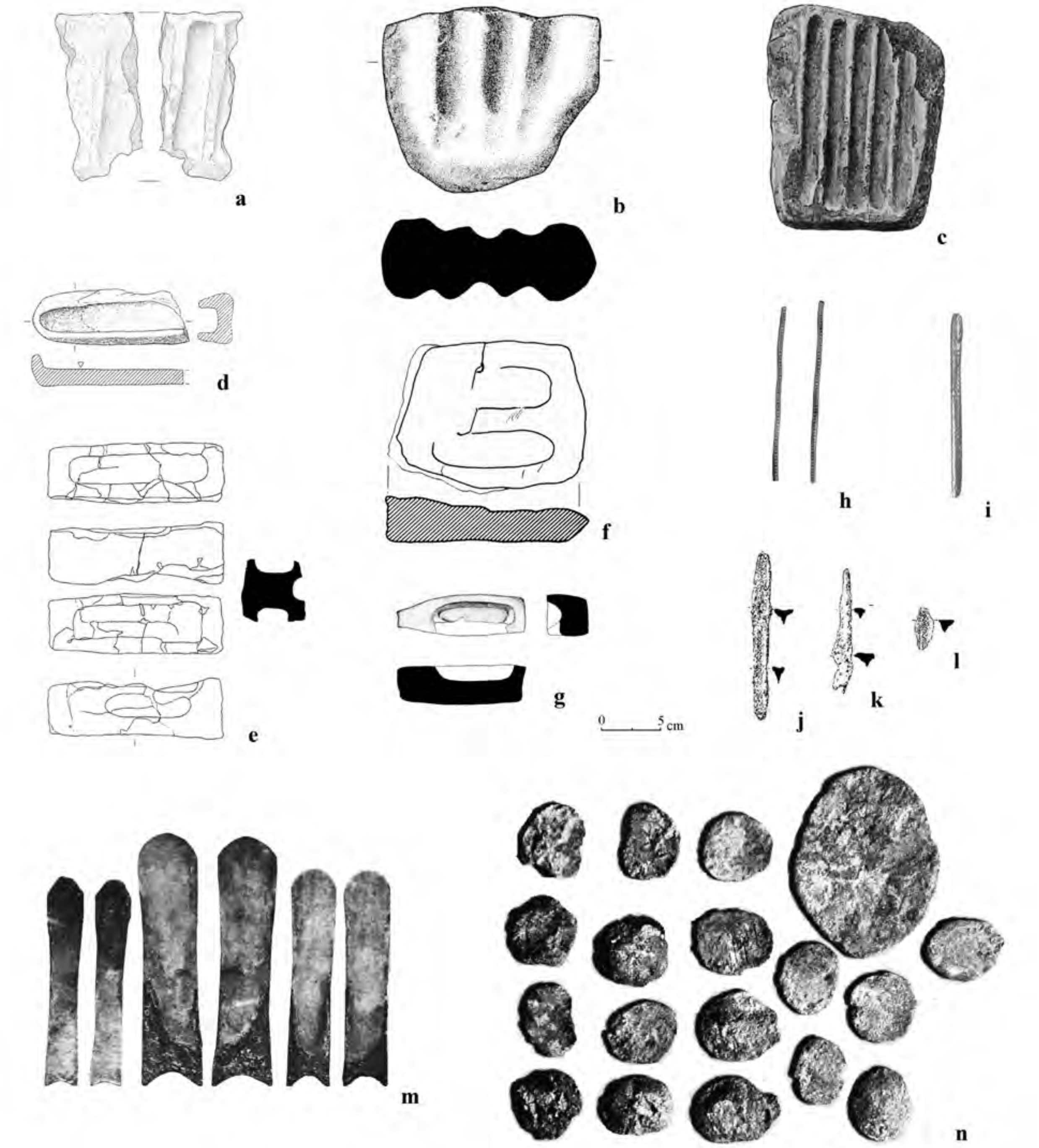


Figure 6.21 Selected ingots and ingot moulds from Early Bronze Age Anatolian sites, to scale: a) multiple rod-ingot mould from Çukuriçi Höyük (Horejs 2009:fig.4.2), b) multiple rod-ingot mould from Göltepe (Yener and Vandiver 1993:fig.4), c) multiple rod-ingot mould from Troy level IIg (Schliemann 1881: cat.no.605), d) single rod-ingot mould from Göltepe (Yener 2000:fig.20), e) multi-faced rod- and oblong bun-ingot mould from Liman Tepe level VI (Keskin 2009:cat.no. 467), f) oblong bun-ingot mould from Aphrodisias Acr.Tr.4, Complex VI-IV (Sharp-Joukowsky 1986:fig.436.61), g) oblong bun-ingot mould from Liman Tepe level V (Keskin 2009:cat.no. 468), h) electrum wire-ingots from Troy level II (Sazcı 2006:cat.no. F-B2 and F-B3), i) electrum rod ingot from Troy II level (Sazcı 2006:cat.no. D-B1), j-k) Early Bronze Age Levantine copper ingots (Doonan et al. 2007:figs.6.2b-c), l) Early Minoan I-IIa copper ingot from Poros-Katsambas (Doonan et al. 2007:fig.6.2d), m) silver tongue-shaped ingots from Troy II (Schliemann 1874:plate VII), n) Silver bun-ingots from Mahmatlar (Koşay and Akok 1950).

Site	Stratigraphy	Date	Type	Material	Notes	Dimensions	Estimated weight	Reference
Hacınebi	pre-contact phase A	c.3400-3200 BC	rod-ingot mould	clay	several moulds	15x5x1.3cm	1010gr	Özbal et al.2000, 9-10
Norşuntepe	level 22	c.2900-2800 cal BC	rod-ingot mould	clay	one mould	-	-	Schmidt 2002
Liman Tepe	"EB I level" houses	c.2900-2700 BC	rod-ingot mould	clay	a mould with one ingot form on each side, different sizes	12x3.2x1.1 cm 11x3-3.8x1.2 cm 7.3x2x1 cm	380gr 415gr 131gr	Keskin 2009, cat.no.467
Liman Tepe	level V	c.2500-2300 BC	oblong bun-ingot mould	clay	a mould with one ingot form	6.6x2.2x1.2 cm	160gr	Keskin 2009, cat.no.468
Çukuriçi Höyük	phase III	2900-2750 cal BC	rod-ingot mould	clay	a mould with 3 ingot forms of the same size on one side, 2 on the other	11.5x2.4-2.6x1.3 cm	340gr	Horejs 2009, 364-5
Çukuriçi Höyük	phase III	2900-2750 cal BC	flat-axe pierced butt mould	clay		-	-	Horejs et al.2010, 16, fig.4.2
Troy	IIg ("Third Burnt City")	c.2200 cal BC	rod-ingot mould	clay	a mould with 5 ingot forms of the same size	16x3.2 cm	-	Schliemann 1881, 484, no.605
Aphrodisias	Acr.Tr.4, Complex VI-IV	2560-2410 cal BC	oblong bun-ingot mould	stone	a mould with 2 ingot forms of the same size	10.4x2.9 cm	-	Sharp-Joukowsky 1986, 288, figure 436.61
Bakla Tepe	"EBA"	-	rod-ingot mould	stone	a mould with one incomplete ingot form	-	-	Keskin 2009, cat.no.474
Alişar Höyük	level 6M	c.2200-1950 BC	rod-ingot mould	stone	a mould with two incomplete ingot forms	-	-	von der Osten 1937, 269, figure 270.e2222
Polatlı	level 3	early 3rd millennium	rod-ingot mould	stone	a multi-faceted broken mould, one is for one rod-ingot	-	-	Lloyd and Gökçe 1951, plate 4d
Göltepe	-	c.2800-2200 cal BC	rod-ingot mould	stone/clay	a mould with 3 ingot forms of the same size on one side, 3 on the other		-	Yener and Vandiver 1993, fig.1; Yener 2000, 105, fig.20
Marki	"EC III"	c.2200-1950 BC	dovetail ingot mould	-	several moulds	-	220-500gr	Webb et al.2006, 276
Marki	Philia phase	c.2400-2300 BC	flat-axe pierced butt mould	-	several moulds	-	-	Webb et al.2006, 264

Site	Stratigraphy	Date	Type	Material	Notes	Dimensions	Weight	Reference
Pulur-Sakyol	level X	c.2900-2700 BC	rod ingot	copper	1 ingot	-	-	Yakar 2002, 16
Tepecik	-	early 3rd millennium	rod ingot	arsenical copper	1 ingot	-	-	Yalçın and Yalçın 2009, 128
Troy	Treasure A1 (Troy II early)	2500-2400 cal BC	dovetail ingot	silver	6 ingots, of three different sizes	between 17.5x3 cm and 21.6x5.2 cm	between 170.8 and 189.2gr	Sazcı 2006, 162-3
Troy	Treasure F (Troy IIg)	2300-2200 cal BC	wire ingot	electrum	16 wire ingots with numerous notches (between 52 and 60)	c.9.5 cm x 0.3 cm diameter	c.10gr apiece	Antonova et al. 1996, 118; Sazcı 2006, 233
Troy	Treasure D (Troy IIg)	2300-2200 cal BC	rod ingot	electrum?	1 rod ingot, not analyzed	16.2x0.9-1 cm	88.5gr	Sazcı 2006, 220
Mahmatlar	"EB III"	2500-2000 BC	circular bun ingot	silver	18 ingots of different sizes found together in a vessel	-	ranging from 394 to 3640gr	Koşay-Akok 1950; Saayre et al.1992, 96
Göltepe	EB II-III	2800-2200 cal BC	rod ingot	lead	1 rod ingot	-	170gr	Yener 2000, 107
Poros-Katsambas	EM I-IIA	3000-2600 BC	triangular ingot	arsenical copper	1 fragment	-	-	Doonan et al.2007, 106
Soloi		2300-1800 BC	flat axe with pierced butt	copper-alloy	6 flat axes with pierced butts	-	-	Bittel 1940, 196, pl.V
Troy	level IIg	2300-2200 cal BC	flat axe with pierced butt	copper-alloy	1 specimen	-	-	Sazcı 2006, 398
Vasilia	Philia/EC	2400-2000 BC	flat axe with pierced butt	copper	1 specimen	-	-	Webb et al.2006, 264, 275
Deneia	"EC III/MC I"	2100-1900 BC	flat axe with pierced butt	arsenical copper	1 specimen	-	c.1kg	Webb et al.2006, 264, 275

Figure 6.22 Summary table of known ingot moulds and ingots from western/central Anatolia and surrounding areas.

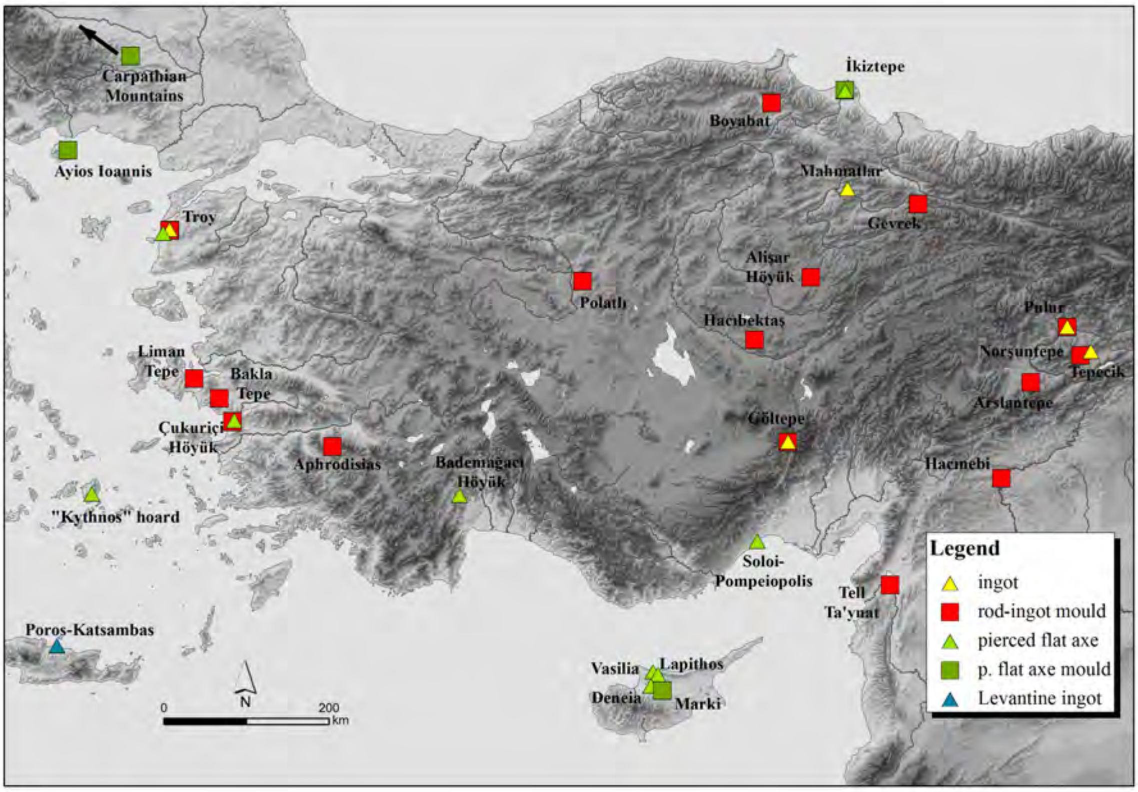


Figure 6.23 Map showing the location of known ingots and ingot moulds from Early Bronze Age Anatolian contexts. The occurrence of pierced flat axes and the correspective moulds (possibly blanks/ingots) has also been plotted (data from figure 6.21 and Horejs 2009).

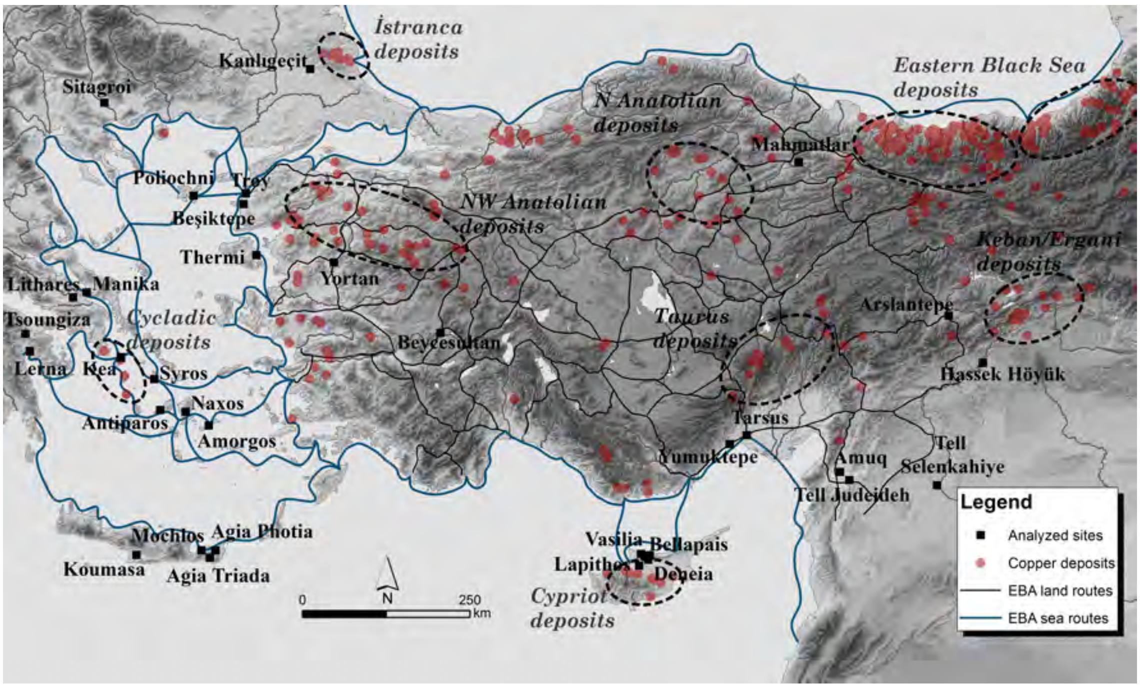


Figure 6.24 Map showing the location of Early Bronze Age sites with lead isotope analysis, compared to that of major metal-bearing areas.

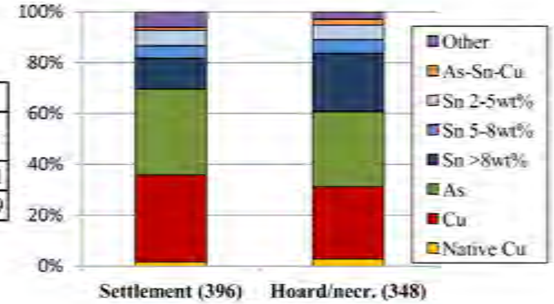
Site	Method	Context	Phase	Period	Sample	Unalloyed copper		Copper alloys						Reference
						Native Cu	Cu	As	Sn >8wt%	Sn 5-8wt%	Sn 2-5wt%	As-Sn-Cu	Other	
Ahlatlıbel	OEA	settl./necr.		EB III	**22**	1	6	6	8				1 Pb-Sb-Cu	Esin 1969:121
Alacahöyük	OEA	necropolis		EB II/III	**34**	7	1	11	11	2	1		1 As-Pb-Cu	Esin 1969:122-123
Alacahöyük	OEA	settlement		MBA	**16**	1	6	4	2	2		1		Esin 1969:122-123
Alişar Höyük (Osten)	unk	settl./necr.	19-13M	EB I	**5**		2	1		1	1			von der Osten 1937c:338-339
Alişar Höyük (Osten)	unk	settl./necr.	12-7M	EB II	**12**		6		3	2	1			von der Osten 1937c:338-339
Alişar Höyük (Esin)	OEA	settl./necr.	19-13M	EB I	**3**		1	2						Esin 1969:124-125
Alişar Höyük (Esin)	OEA	settl./necr.	12-7M	EB II	**16**	1	10	3			2			Esin 1969:124-125
Alişar Höyük (Esin)	OEA	settl./necr.	6-5M	EB III	**2**		2							Esin 1969:124-125
Alişar Höyük (Esin)	OEA	settl./necr.	4-3M	MBA	**75**	7	38	14	3	2	3	3	5 Sn-Pb-Cu	Esin 1969:125-128
Bayındırköy	OEA	necropolis		EB II	**6**		3	3						Esin 1969:128
Beycesultan	OEA	settlement	XXXIV-XXI	LCh	**10**		6	4						Esin 1969:129
Beycesultan	OEA	settlement	XVIII-XIII	EB II	**8**		4	4						Esin 1969:128
Beycesultan	OEA	settlement	XII-IX	EB III	**4**		4							Esin 1969:128
Beycesultan	OEA	settlement	V-VIII	MBA	**14**		7	4			3			Esin 1969:128-129
Beycesultan	OEA	settlement	I-III	LBA	**20**		14	4			2			Esin 1969:129-30
Boğazköy	OEA	settlement	III	MBA	**5**	2	2	1						Esin 1969:130
Eti Yokuşu	OEA	settlement		EB II	**3**		3							Esin 1969:131
Tarsus (Esin)	OEA	settlement		EB II	**26**	4	13	4		1	2	1	1 Sn-Pb-As-Cu	Esin 1969:131-133
Tarsus (Esin)	OEA	settlement		EB III	**27**	6	11	5			1	3	1 Sn-Pb-As-Cu	Esin 1969:131-133
Tarsus (Esin)	OEA	settlement		MBA	**8**	1	3	4						Esin 1969:131-133
Tarsus (Esin)	OEA	settlement		LBA	**10**		2		1	4	2	1		Esin 1969:133
Horoztepe	OEA	necropolis		EB III	**30**	2	2	9	16				1 Sn-Pb-Cu	Esin 1969:134
Kayapınar	OEA	hoard		EB III	**8**	1	2	3	1		1			Esin 1969:135
Kusura	OEA	settlement		EB II	**17**		7	6		3		1		Esin 1969:136
Kusura	OEA	settlement		MBA	**39**	5	22	5		1	1	5		Esin 1969:136-137
Kültepe	OEA	settlement	Karum III-IV	EB III	**15**	2	7	2	3	1				Esin 1969:138-142
Kültepe	OEA	settlement	Karum I-II	MBA	**75**	6	28	9	19	2	5	4	2 Sn-Pb-Cu	Esin 1969:138-142
Polatlı	OEA	settlement		EB III	**7**		2	1	1	1	2			Esin 1969:141
Pulur	OEA	settlement		LCh	**5**		5							Esin 1969:142
Pulur	OEA	necropolis		LBA	**10**		1		4	4	1			Esin 1969:142
Troad (Esin)	OEA	hoard		EB II/III	**20**		1	5	11				3 Sn-Pb-Cu	Esin 1969:142-143
Troy (Esin)	OEA	settl./hoard	II-IV	EB III	**10**	2	1	1	1	3	2			Esin 1969:143-144
Yazılıkaya	OEA	necropolis		EB II	**8**		3	3		1	1			Esin 1969:144
Yortan (Esin)	OEA	necropolis		EB II/III	**7**		1	6						Esin 1969:144
Yumuktepe (Esin)	OEA	settlement	XVI-XIII	LCh	**18**	11	6	1						Esin 1969:144-145
Yumuktepe (Esin)	OEA	settlement	XII-XI	EB III	**7**		4	3						Esin 1969:145
Yumuktepe (Esin)	OEA	settlement	X-IX	MBA	**23**	1	13	6	1		2			Esin 1969:145-146
Yumuktepe (Esin)	OEA	settlement	VIII	LBA	**4**		1	2					1 Pb-Cu	Esin 1969:146
Mahmatlar	OEA	hoard		EB III	**9**	1		1	7					Esin 1969:141
Soloi-Pompeiopolis	unk	hoard		EB III/MBA	**10**		3	1	4	1			1 Sb-Cu	Bittel 1940
Karataş	Laser	necropolis		EB II/III	**9**	3	2	1		1			1 Zn-Cu, 1 Ag-Cu	Alpers-Bordaz 1978:314

Figure 6.25a Summary table of metal chemical composition analysis carried out on copper-based artefacts before the 1980s, detailing the method employed in the analysis, the total number of samples, and the different types of copper alloys. OEA = Optical Emission Analysis.

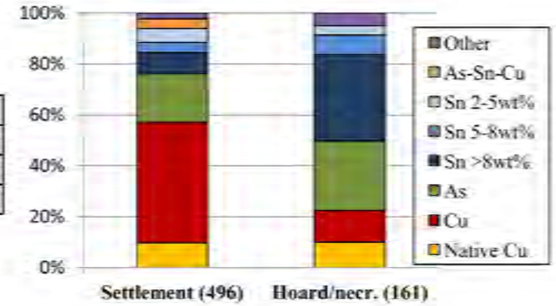
Site	Method	Context	Phase	Period	Sample	Unalloyed copper		Copper alloys						Reference
						Native Cu	Cu	As	Sn >8wt%	Sn 5-8wt%	Sn 2-5wt%	As-Sn-Cu	Other	
Acemhöyük	unk	settlement		MBA	**80**		33	34	13					Earl and Özbal 1996, 302
Arslantepe	ICP, TIMS	hoard	VIA	LCh	**8**			8						Hauptmann et al.2002
Arslantepe	ICP, TIMS	grave	VIB1	EB I	**60**		7	16					29 Ag-Cu, 7 As-Ni-Cu, 1As-Sb-Cu	Hauptmann et al.2002
Bakla Tepe	INAA	settl./necr.		LCh	**5**	1		4						Keskin 2009, appendix 9
Bakla Tepe	INAA	settl./necr.		EB I	**8**	1	1	6						Keskin 2009, appendix 9
Bakla Tepe	INAA	necropolis		EB III	**8**	1		4	1		1		1 Sn-Pb-Cu	Keskin 2009, appendix 9
Bekaroğlu	P-XRF	hoard		early EBA	**5**			5						Zimmermann and Ipek 2010
Beşiktepe	INAA	settlement	"Troy I"	EB I	**23**	1	18	2	2					Begemann et al. 2003
Beşiktepe	INAA	necropolis	"Troy VI"	LBA	**11**				10	1				Begemann et al. 2003
Demircihöyük	INAA	necropolis	L-Q	EB II	**18**	1	3	8	6					Pernicka 2000
Gedikli Höyük	unk	necropolis		EB III	**96**		57	14	18			7		Kuruçayırlı and Özbal 2005
Göltepe	unk	settlement		EB III	**8**		1		5		1	1		Yener et al 2003
Kalınkaya	P-XRF	necropolis		EB III	**45**	3	7	19	9	3	2		1 Sn-Pb-Cu, 1 Ni-Cu	Geniş 2011
Kanlıgeçit	unk	settlement	KG 2	EB III	**5**			4		1				Yalçın 2012
Liman Tepe	INAA	settlement	VII	LCh	**5**			4					1 Pb-Cu	Keskin 2009: appendix 9
Liman Tepe	INAA	settlement	VI	EB I	**6**	1		4	1					Keskin 2009: appendix 9
Liman Tepe	INAA	settlement	V	EB II	**3**		1	1	1					Keskin 2009: appendix 9
Liman Tepe	INAA	settlement	IV	EB III	**3**		1	1		1				Keskin 2009: appendix 9
Poliochni	INAA	settlement	Blue	EB I	**6**		2						3 Pb-Cu, 1 As-Pb-Cu	Pernicka et al. 1990
Poliochni	INAA	settlement	Green	EB II	**11**	1	4	2	1	1			2 As-Pb-Cu	Pernicka et al. 1990
Poliochni	INAA	settlement	Red	EB II	**28**	1	6	13	4	2	1		1 As-Pb-Cu	Pernicka et al. 1990
Poliochni	INAA	settlement	Yellow	EB III	**52**	1	18	4	13	4	6	2	1 Sn-Pb-Cu, 3 As-Pb-Cu	Pernicka et al. 1990
Resuloğlu	P-XRF	necropolis		EB III	**76**	4	10	10	22	11	13		3 Sn-Pb-Cu, 1 Sn-Ag-Cu,1 Sb-Cu, 1 As-Sb-Cu	Zimmermann 2007; Zimmermann and Yıldırım 2010, 2011
Tarsus (K&Ö)	AAS	settlement		EB III	**20**		5	8		4	3			Kuruçayırlı and Özbal 2005
Tarsus (K&Ö)	AAS	settlement		MBA	**9**		7	1			1			Kuruçayırlı and Özbal 2005
Tarsus (K&Ö)	AAS	settlement		LBA	**21**		3		2	2	8	2	3 Zn-Cu, 1 Sn-Pb-Zn-Cu	Kuruçayırlı and Özbal 2005
Tarsus (K&Ö)	AAS	settlement		EB II	**14**		6	4		2			2 Sb-Cu	Kuruçayırlı and Özbal 2005; Özbal et al. 2005
Thermi	INAA	settlement	I-II	EB I	**34**		9	21			1		3 Zn-Cu	Stos-Gale 1992
Thermi	INAA	settlement	III	EB II	**16**		6	9			1			Begemann et al.1992, 1995
Thermi	INAA	settlement	IV	EB II	**9**		4	4					1 As-Pb-Cu	Begemann et al.1992, 1995
Thermi	INAA	settlement	V	EB II	**14**		1	6	3	2	2			Begemann et al.1992, 1995
Troy (G-SG-G)	INAA	settl./hoard	II-IV	EB III	**15**		4	2	5	2	2			Gale et al. 1984, 1985
Yortan (G-SG-G)	INAA	necropolis		EB II	**6**			6						Gale et al.1985
Yumuktepe (K&Ö)	AAS	settlement	X-IX	MBA	**4**		2		1				1 Ni-Cu	Kuruçayırlı and Özbal 2005
Yumuktepe (K&Ö)	AAS	settlement	VIII	LBA	**12**		7	2	1	1			1 Sn-Pb-Cu	Kuruçayırlı and Özbal 2005

Figure 6.25b Summary table of metal chemical composition analysis carried out on copper-based artefacts after the 1980s, detailing the method employed in the analysis, the total number of samples, and the different types of copper alloys. ICP = Inductively Coupled Plasma Mass Spectrometry, TIMS= Thermal Ionization Mass Spectrometry, P-XRF=Portable X-Ray Fluorescence Analysis, INAA= Instrumental Neutron Activation Analysis, AAS= Atomic Absorption Spectrometry. NB: for Thermi I-II, the early claim made by Stos-Gale 1992 of large quantities of lead-copper alloys (21 out of 34 samples with Pb content >3 wt%, averaging c.8.5 wt%), analyzed with XRF, was dismissed by Begemann et al. 1995, who analyzed the same samples with INAA and found very low concentrations of lead.

	Context	Sample	Unalloyed copper		Copper alloys					
			Native Cu	Cu	As	Sn >8wt%	Sn 5-8wt%	Sn 2-5wt%	As-Sn-Cu	Other
post-1980s	Settlement	**396**	1.8	34.1	33.8	11.9	5.1	6.1	1.3	6.1
	Hoard/necr.	**348**	2.9	28.3	29.6	22.8	5.5	5.8	2.3	2.9



	Context	Sample	Unalloyed copper		Copper alloys					
			Native Cu	Cu	As	Sn >8wt%	Sn 5-8wt%	Sn 2-5wt%	As-Sn-Cu	Other
pre-1980s	Settlement	**496**	9.7	47.4	19.2	8.3	4.0	5.4	3.8	2.2
	Hoard/necr.	**161**	9.9	12.4	27.3	34.2	7.5	3.7	0.0	5.0



	Context	Sample	Unalloyed copper		Copper alloys					
			Native Cu	Cu	As	Sn >8wt%	Sn 5-8wt%	Sn 2-5wt%	As-Sn-Cu	Other
all	Settlement	**892**	6.2	41.5	25.7	9.9	4.5	5.7	2.7	3.9
	Hoard/necr.	**509**	4.9	21.2	26.7	24.8	5.7	4.7	1.4	3.3

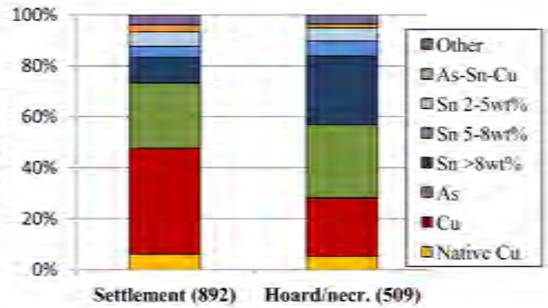
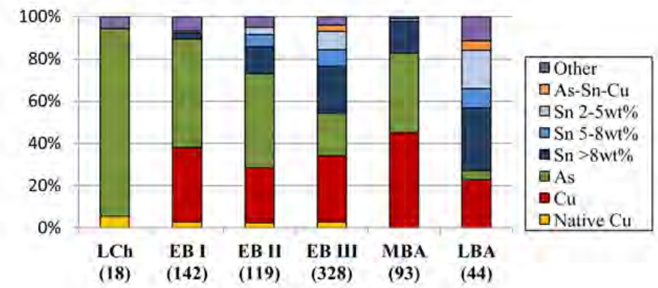
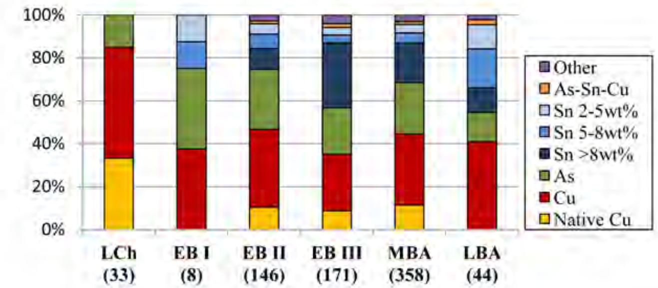


Figure 6.26 Summary tables and bar charts showing proportions of different copper-based alloy divided by context (all archaeological periods from Late Chalcolithic to Late Bronze Age). a) pre-1980s analyses, b) post-1980s analyses, c) total sample. NB: the large dataset from Arslantepe "Royal" grave (EB I), almost entirely composed of arsenic-nickel-copper and silver-copper artefacts, has been omitted to avoid skewing the analysis.

	Period	No.Sites	Sample	Unalloyed copper		Copper alloys					
				Native Cu	Cu	As	Sn >8wt%	Sn 5-8wt%	Sn 2-5wt%	As-Sn-Cu	Other
post-1980s	LCh	3	**18**	5.6	0.0	88.9	0.0	0.0	0.0	0.0	5.6
	EB I	7	**142**	2.1	26.1	38.0	2.1	0.0	0.7	0.0	4.9
	EB II	6	**119**	2.5	26.1	44.5	12.6	5.9	3.4	0.0	5.0
	EB III	10	**328**	2.7	31.4	20.1	22.3	7.9	8.5	3.0	4.0
	MBA	3	**93**	0.0	45.2	37.6	15.1	0.0	1.1	0.0	1.1
	LBA	3	**44**	0.0	22.7	4.5	29.5	9.1	18.2	4.5	11.4



	Period	No.Sites	Sample	Unalloyed copper		Copper alloys					
				Native Cu	Cu	As	Sn >8wt%	Sn 5-8wt%	Sn 2-5wt%	As-Sn-Cu	Other
pre-1980s	LCh	3	**33**	33.3	51.5	15.2	0.0	0.0	0.0	0.0	0.0
	EB I	1	**8**	0.0	37.5	37.5	0.0	12.5	12.5	0.0	0.0
	EB II	9	**146**	10.3	36.3	28.1	9.6	6.8	4.8	1.4	2.7
	EB III	13	**171**	8.8	26.3	21.6	30.4	3.5	3.5	1.8	4.1
	MBA	8	**358**	11.5	33.0	24.0	18.4	4.7	3.9	1.4	3.1
	LBA	4	**44**	0.0	40.9	13.6	11.4	18.2	11.4	2.3	2.3



	Period	No.Sites	Sample	Unalloyed copper		Copper alloys					
				Native Cu	Cu	As	Sn >8wt%	Sn 5-8wt%	Sn 2-5wt%	As-Sn-Cu	Other
all	LCh	6	**51**	23.5	33.3	41.2	0.0	0.0	0.0	0.0	2.0
	EB I	8	**150**	2.0	26.7	38.0	2.0	0.7	1.3	0.0	4.7
	EB II	14	**265**	6.8	31.7	35.5	10.9	6.4	4.2	0.8	3.8
	EB III	21	**499**	4.8	29.7	20.6	25.1	6.4	6.8	2.6	4.0
	MBA	9	**451**	9.1	35.5	26.8	17.7	3.8	3.3	1.1	2.7
	LBA	5	**88**	0.0	31.8	9.1	20.5	13.6	14.8	3.4	6.8

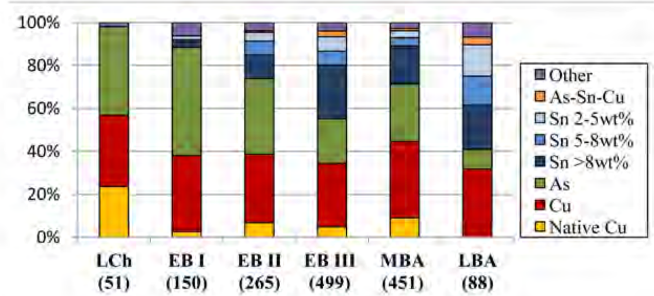


Figure 6.27 Summary tables and bar charts showing proportions of different copper-based alloy divided by period (all archaeological contexts). a) pre-1980s analyses, b) post-1980s analyses, c) total sample. NB: the large dataset from Arslantepe "Royal" grave (EB I), almost entirely composed of arsenic-nickel-copper and silver-copper artefacts, has been omitted to avoid skewing the analysis.

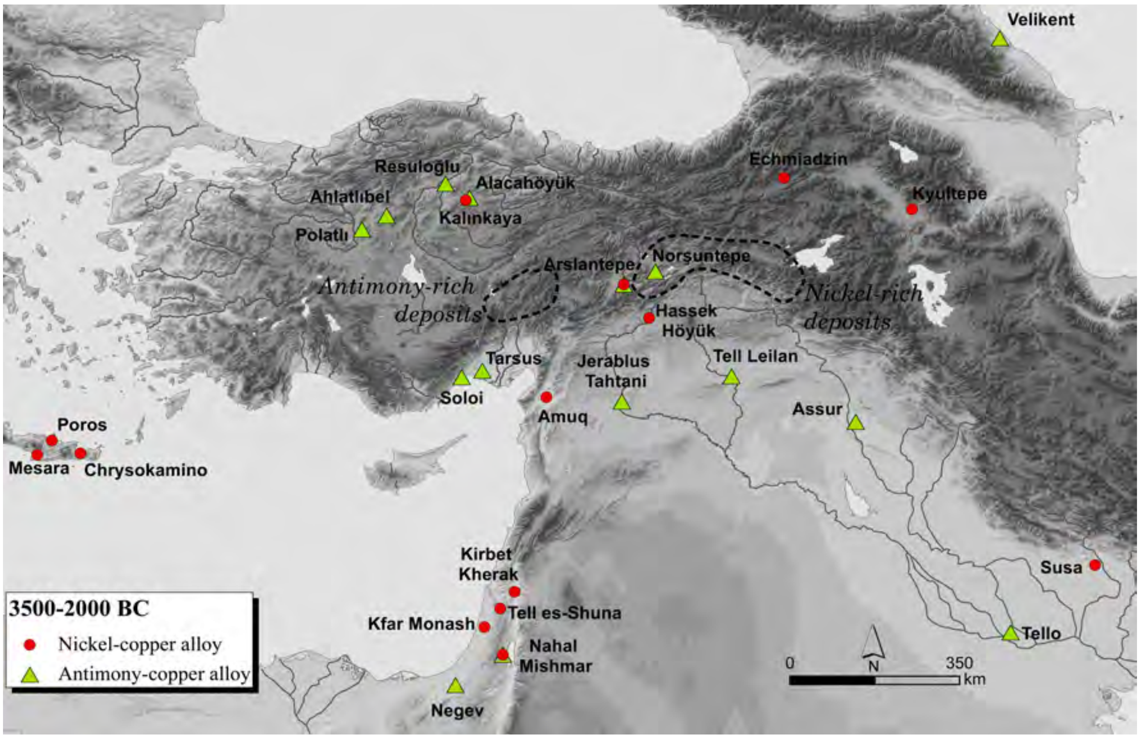


Figure 6.28 Map showing the distribution of Late Chalcolithic and Early Bronze Age antimony-copper and arsenic-nickel-copper artefacts within the eastern Mediterranean and the Near East, together with the possible sources (data from: Catapotis and Bassiakos 2007; Doonan et al. 2007; Özbal et al.2005; Haputmann et al. 2002).

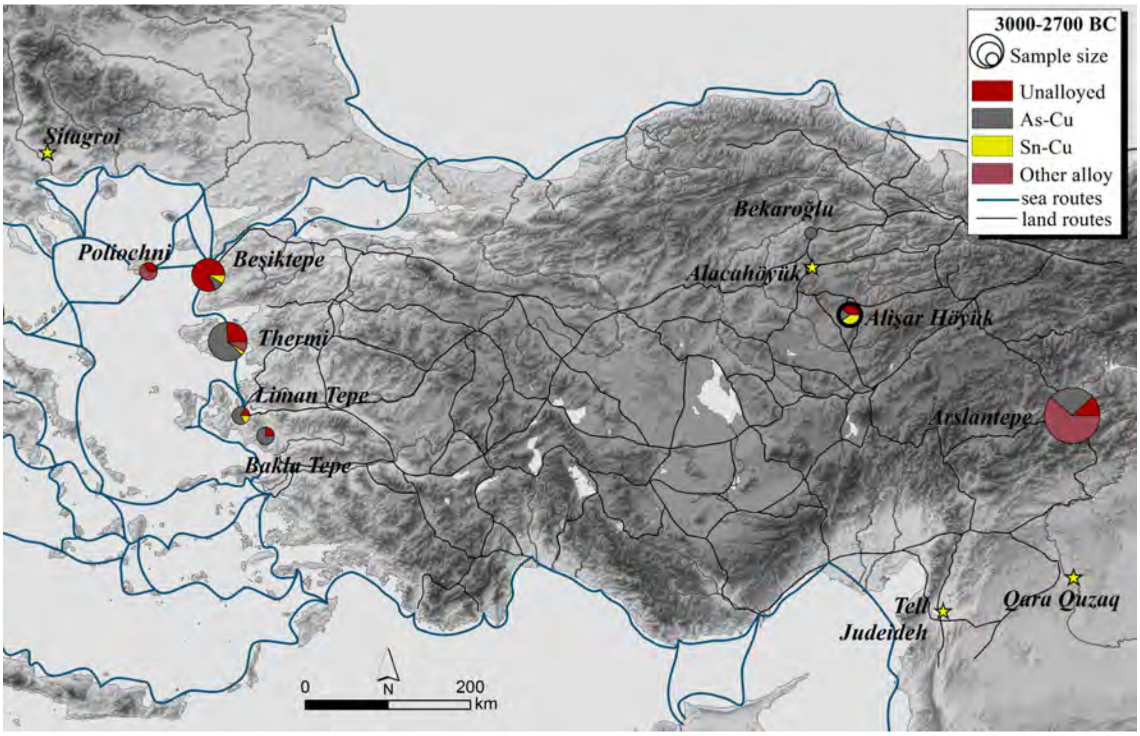


Figure 6.29 Map showing the composition of metal assemblages at analysed sites between c.3000 and 2700 BC ("EB I" period), overlaid with the proposed Early Bronze Age main land and sea routes (cf. chapter 3). Symbol size reflects the size of the sample (from 6 to 60). Yellow stars indicate the presence of tin bronzes within an otherwise unknown dataset, while circles marked with a thicker black outline indicate pre-1980s analyses.

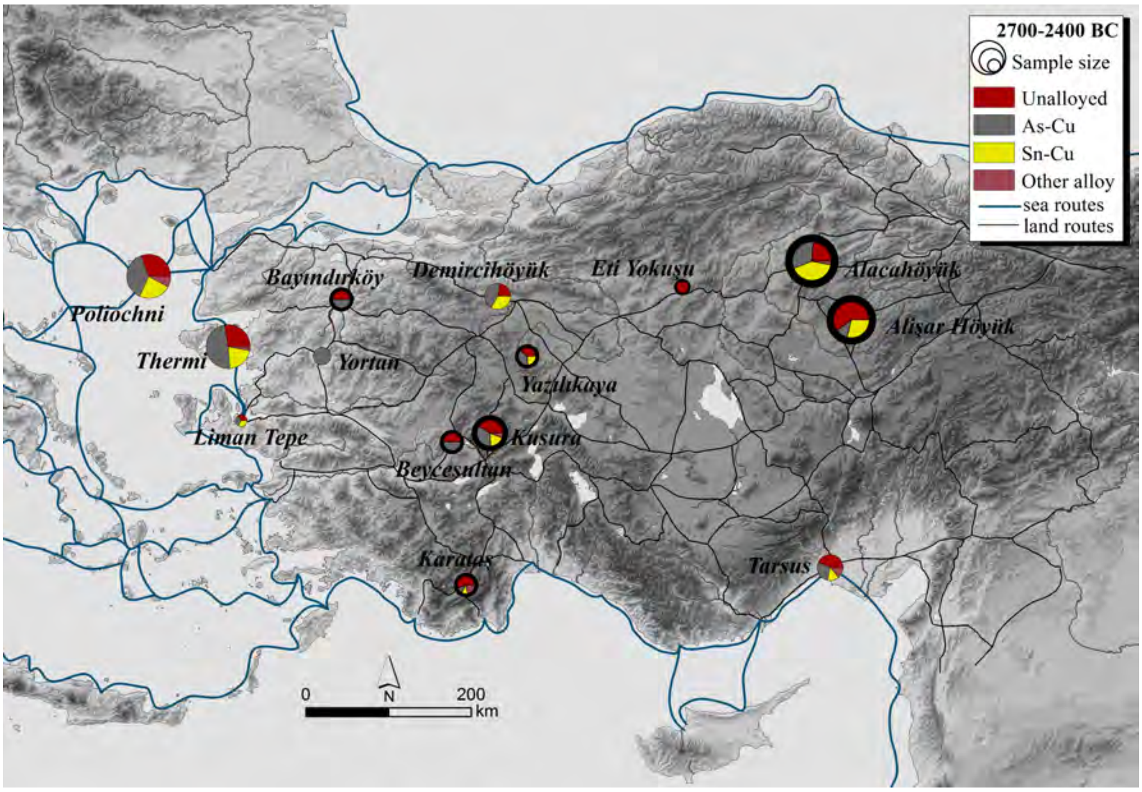


Figure 6.30 Map showing the composition of metal assemblages at analyzed sites between c.2700 and 2400 BC ("EB II" period), overlaid with the proposed Early Bronze Age main land and sea routes (cf. chapter 3). Symbol size reflects the size of the sample (from 8 to 39). Circles marked with a thicker black outline indicate pre-1980s analyses.

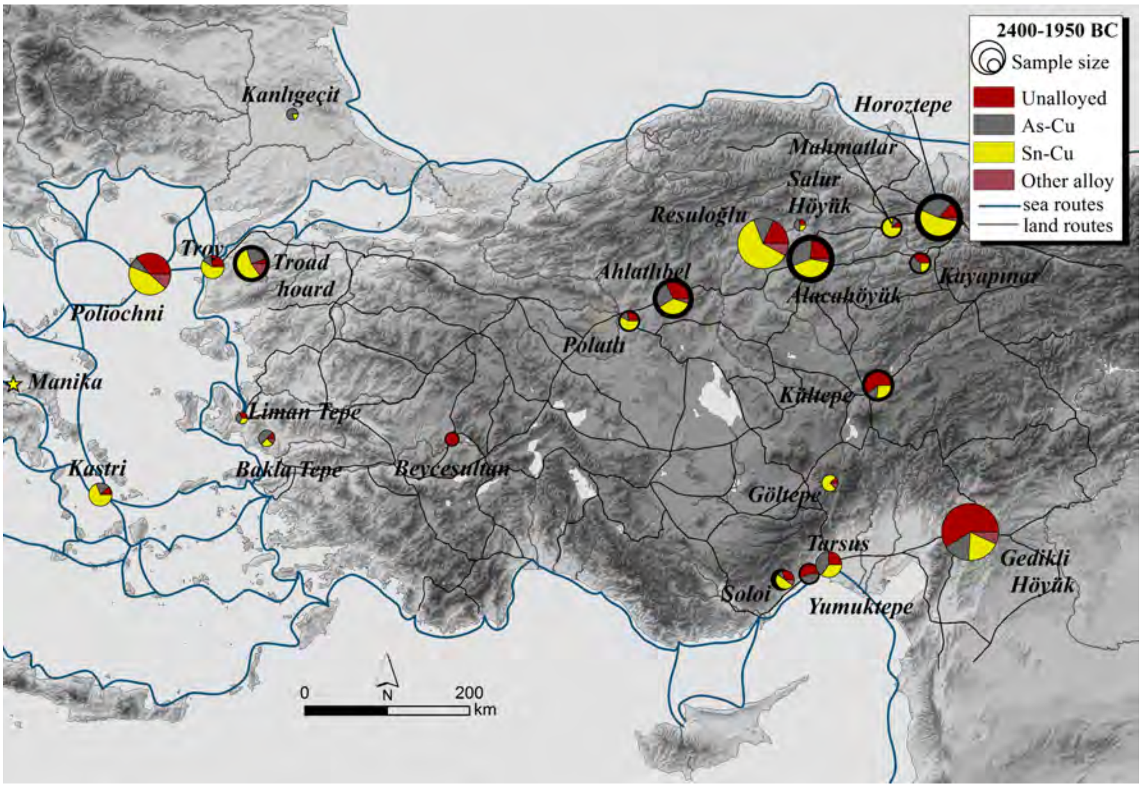


Figure 6.31 Map showing the composition of metal assemblages at analyzed sites between c.2400 and 1950 BC ("EB III" period), overlaid with the proposed Early Bronze Age main land and sea routes (cf. chapter 3). Symbol size reflects the size of the sample (from 4 to 96). Yellow stars indicate the presence of tin bronzes within an otherwise unknown dataset, while circles marked with a thicker black outline indicate pre-1980s analyses.

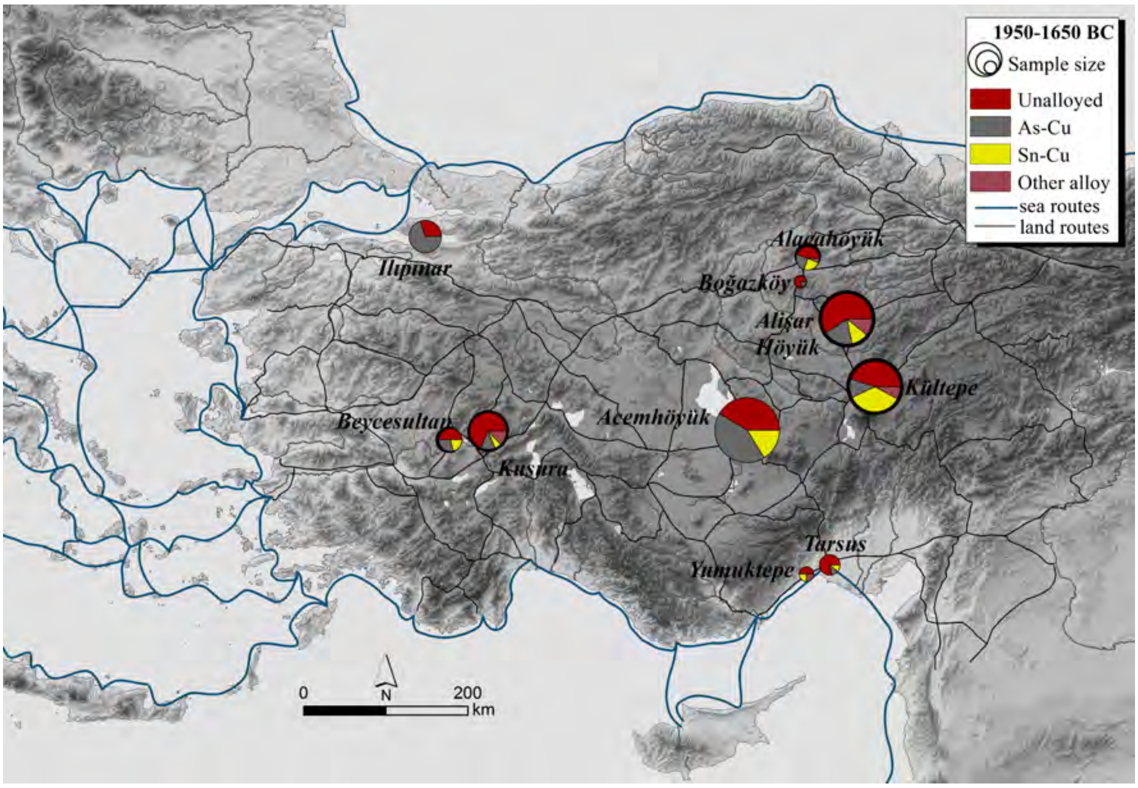


Figure 6.32 Map showing the composition of metal assemblages at analyzed sites between c.1950 and 1650 BC ("MBA" period), overlaid with the proposed Early Bronze Age main land and sea routes (cf. chapter 3). Symbol size reflects the size of the sample (from 4 to 80). Circles marked with a thicker black outline indicate pre-1980s analyses.

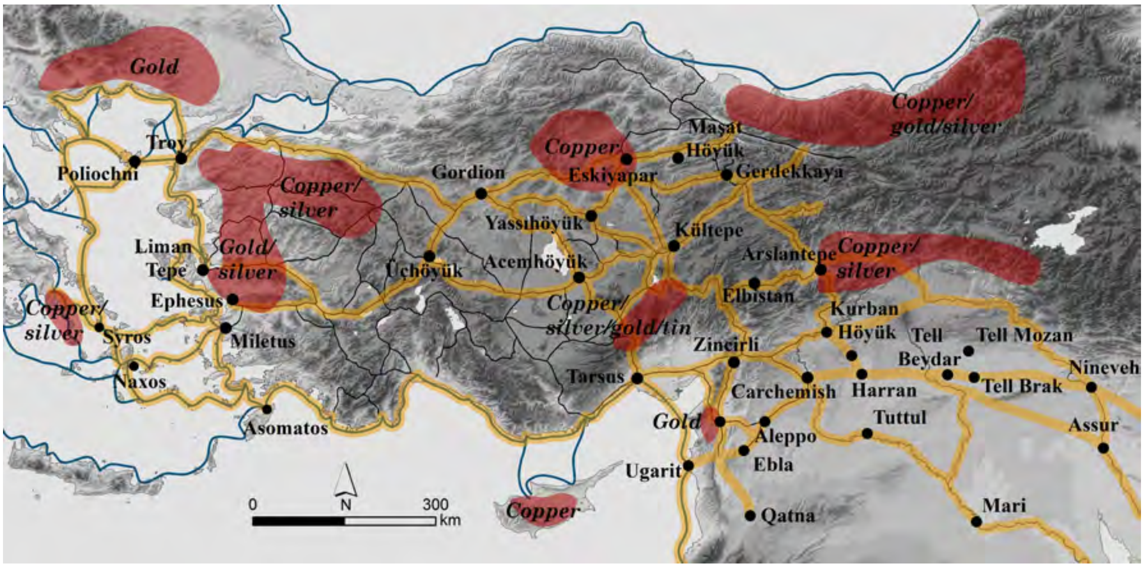


Figure 6.33 Map showing the location of the main metal-producing areas between Anatolia, Upper Mesopotamia, the Aegean and the eastern Mediterranean, overlaid with the proposed Early Bronze Age main routes and main settlements. Orange lines suggest the path of major metal routes.
Data on Upper Mesopotamian routes from Roaf and Collon 1990.

Map No.	Site name	Context	Tot	Manufacturing materials						Schematic style							Naturalistic style					Express.		Reference
				Clay	Stone	Marble	O-stone	"Alabaster"	Metal	I.1	I.2	I.3	I.4	I.5	I.6a	I.6b	II.1	II.2	II.3	II.4	II.5	III.1	III.2	
52	Acemhöyük	domestic	**2**	1	1			1								1								Bilgi 2012
32	Ağın	funerary	**2**		2	2				2														Alp 1965
56	Ahlatlıbel	domestic	**11**	10	1		1													6				Koşay 1934
62	Alacahöyük	domestic/ funerary-elite	**19**	10	1		1		6						1					5		3		Koşay 1951
11	Alaşehir	?	**2**		2	2					2													Bilgi 2012
68	Alişar Höyük	domestic	**11**	7	4		1	3							5					1	1			Bilgi 2012
42	Antalya (vicinity)	?	**4**		3		3						2	2										Aydıngün 2006
47	Aphrodisias	domestic	**3**		3		3							3										Sharp-Joukowsky 1986
10	Babaköy	funerary	**3**	3																	1			Bilgi 2012
41	Bademağacı	domestic	**5**	5														4						Aydıngün 2006
8	Baklatepe	domestic	**6**	3	3	2	1							2					2					Bilgi 2012
60	Balibağı	funerary	**4**		4			4																Süel 1992
23	Bavurdu	?	**1**	1													1							Bilgi 2012
30	Beycesultan	"shrine"	**11**		11	11				9	2													Lloyds and Mellaart 1962
16	Bozüyük	domestic	**1**	1													1							Koerte 1899
37	Burdur (vicinity)	?	**7**		7	4	3			1		2	2	2										Aydıngün 2006
26	Burhaniye	?	**1**		1	1					1													Aydıngün 2006
44	Büyükada	?	**2**		2	2						2												Bilgi 2012
33	Çamharman	?	**1**		1	1					1													Şahoğlu and Sotirakopoulou 2011
40	Çaykenarı	?	**2**	2														2						Bilgi 2012
25	Çıkrık Höyük	?	**1**	1		1											1							Aydıngün 2006
13	Çınarcık Köyü	?	**8**		8	8					2	6												Aydıngün 2006
48	Çine-Tepecik	domestic/ funerary	**4**		4	3	1			3		1												Günel 2014
17	Demircihöyük	domestic/ funerary	**176**	176	2	2						2					12				11			Obladen-Kaude 1996; Seeher 2000
7	Emporio	domestic	**2**	2															2					Hood 1982
58	Etiyokuşu	domestic	**6**	6											1					2	2			Kansu 1940
12	Gavurtepe	funerary	**1**		1	1				1														Meriç 1993
50	Hacılar Höyük	?	**2**		1	1				1			1											Bilgi 2012
36	Harmanören	funerary	**5**	1	4	2	2			1		2						1						Özsait 2003
59	Hasanoğlan	?	**1**						1													1		Bilgi 2012
67	Horoztepe	funerary-elite	**2**						2													2		Özgüç and Akok 1958
27	Kaklık Mevkii	funerary	**5**	1	4	4					3	1					1							Topbaş et al.1998
63	Kalınkaya	funerary	**1**	1																1				Bilgi 2012
1	Kanlıgeçit	domestic	**2**	2													2							Karul 2012
24	Karaağaç	funerary	**1**		1	1					1													Alp1965

Figure 7.1 Summary table of EBA figurine finds across west and central Anatolia, with details about the retrieval context, the manufacturing material, and the different artefact types present at individual sites. Note that the “Stone” column is a sum of “Marble”, “Alabaster” and “Other stone”.

Map No.	Site name	Context	Tot	Manufacturing materials						Schematic style							Naturalistic style					Express.		Reference
				Clay	Stone	Marble	O-stone	"Alabaster"	Metal	I.1	I.2	I.3	I.4	I.5	I.6a	I.6b	II.1	II.2	II.3	II.4	II.5	III.1	III.2	
22	Karacaahmet	?	**2**		2	2					1	1												Aydıngün 2006
46	Karahisar	funerary	**11**		11	11							11											Yayalı and Akdeniz 2002
51	Konya-Karahöyük	domestic	**2**		2	2								2										Alp 1965
55	Karaoğlan Höyük	domestic	**8**	8											2					1				Bilgi 2012
28	Karaoğlan Mevkii	domestic	**1**		1	1					1													Topbaş et al1998
43	Karataş	domestic/ funerary	**10**		10	7	3					1	2	2										Aydıngün 2006
54	Karayavşan	?	**4**	3	1		1								1					1				Bilgi2012
21	Kocaan Höyük	?	**1**		1	1					1													Bilgi 2012
57	Koçumbeli	domestic	**8**	8																6	1			Bilgi 2012
20	Küllüoba	domestic	**33**	22	14	6	8					1		5			19				3			Öner 2009
69	Kültepe	elite building/ funerary	**55**	8	47			47							11	23							11	Bilgi2012
38	Kuruçay	domestic	**3**	3														3						Bilgi2012
31	Kusura	domestic	**9**	3	6	6					1	4		1			1	2						Lamb 1937, 1938
6	Kyme	?	**1**		1									2										Bilgi2012
49	Malkaya mağarası	cave (sanctuary?)	**1**		1					1														Peshlow-Bindokat 2007
65	Maşat Höyük	domestic	**3**	3											1					1				Bilgi 2012
35	Nudra	?	**1**	1													1							Bilgi 2012
64	Pazarlı	?	**1**	1																1				Bilgi 2012
53	Polatlı	domestic	**1**	1																				Bilgi 2012
3	Poliochni	domestic	**3**	1	2	2													1					Bernabò Brea 1964
61	Resuloğlu	funerary	**1**		1			1																Bilgi 2012
19	Sepetçi	?	**1**	1													1							Efe 1996
15	Seyitömer Höyük	domestic	**6**	2	5		5							2										Aydıngün 2006
14	Şubak	funerary	**7**		7	7					7													Efe 1992
29	Susuz Höyük	?	**2**		2	2					2													Bilgi 2012
5	Thermi	domestic	**10**	6	4	4								1					5					Lamb 1936
4	Troy	domestic/ elite area?	**31**	2	19	11	8					1		11					1					Blegen et al. 1951
39	Ürküt	funerary	**1**		1	1							1											Alp 1965
34	Yalvaç (vicinity)	?	**1**	1														1						Bilgi 2012
45	Yassıhöyük	?	**1**		1	1					1													Bilgi 2012
2	Yenibademli Höyük	domestic	**4**	4															4					Huriylmaz 2002
9	Yortan	funerary	**3**		3	3				1				3										Kamil 1982
18	Yukarı Söğütönü	?	**1**	1																	1			Bilgi 2012
70	Zencideresi	?	**1**		1			1								1								Bilgi 2012
66	Zile	?	**1**	1																	1			Bilgi 2012
	TOTAL		**544**	**313**	**214**	**115**	**41**	**57**	**9**	**20**	**26**	**24**	**19**	**38**	**22**	**25**	**40**	**13**	**15**	**25**	**21**	**6**	**11**	

Figure 7.1 (continued).

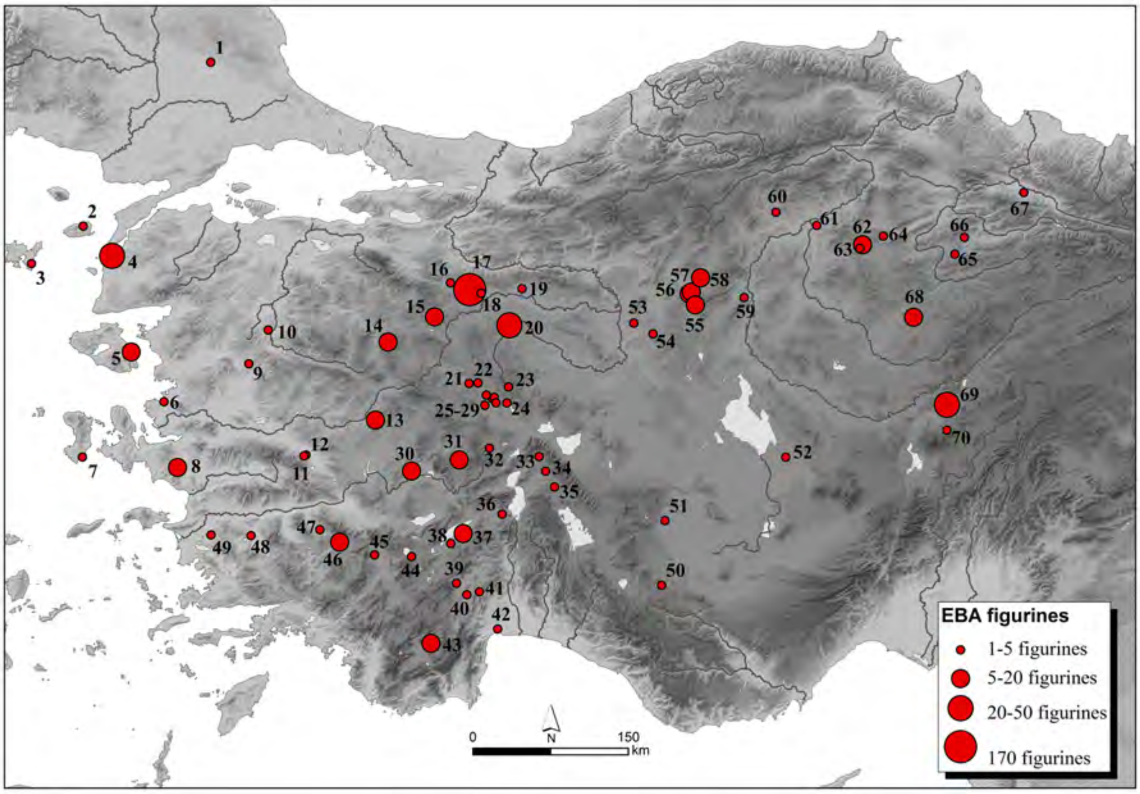


Figure 7.2. Map showing the EBA figurine findspots in west and central Anatolia, and the number of artefacts at each site. Site numbers refer to the "Map No." column in figure 7.1.

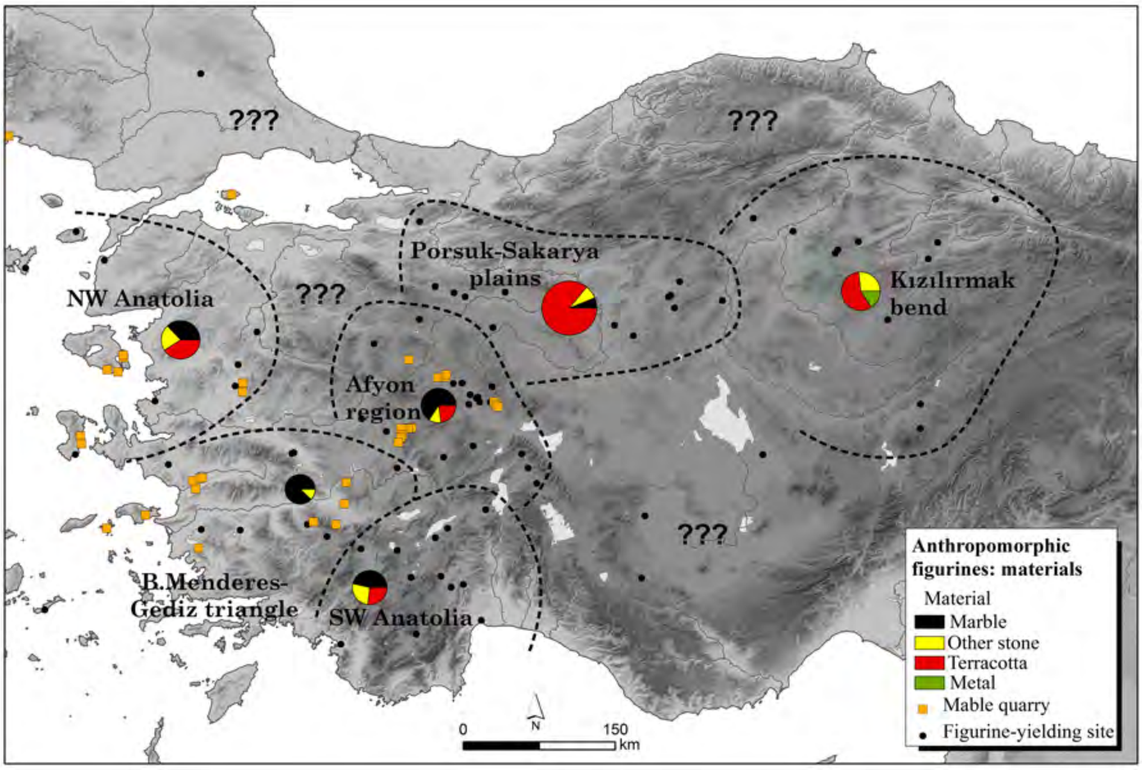


Figure 7.3. Map showing the proportion of stone (marble vs. other local materials), terracotta and metal figurines in different regions of EBA Anatolia. The location of known Classical marble quarries is also shown for comparison (data from Attanasio 2006; Takaoğlu 2005; Zöldföldi 2011).

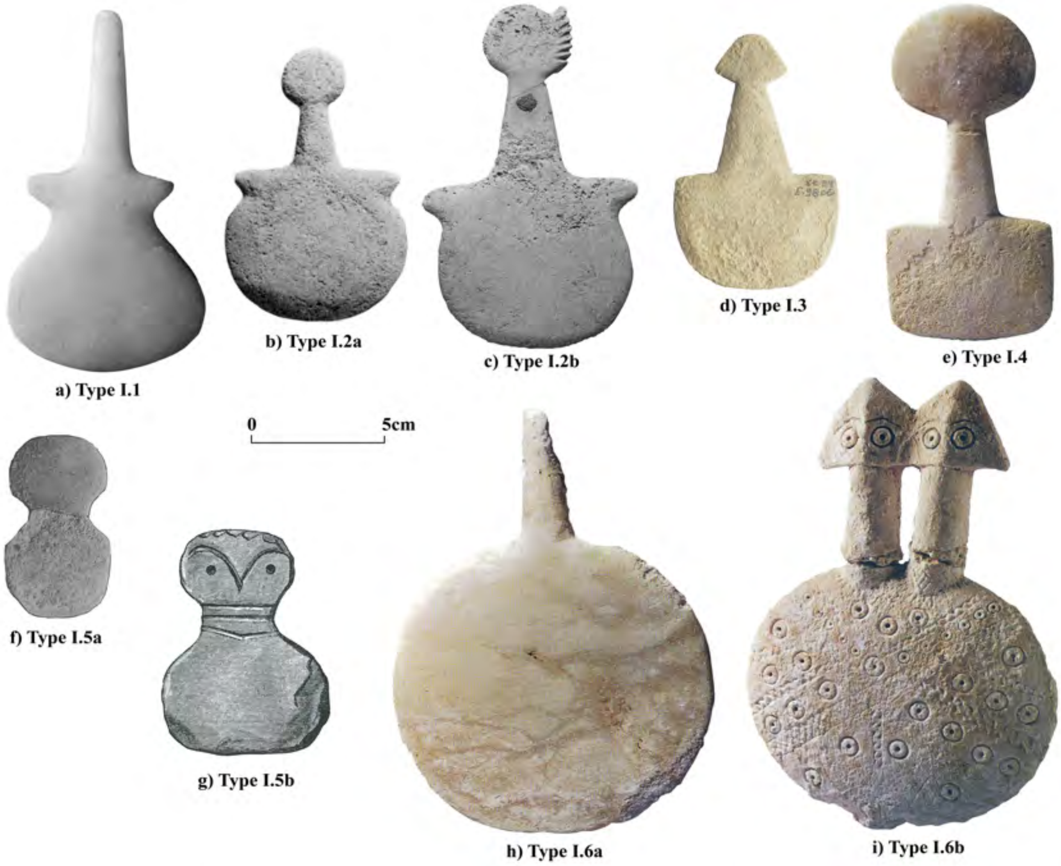


Figure 7.4 EBA Anatolian anthropomorphic figurines (schematic style), arranged by type and at the same scale: a) Beycesultan (Bilgi 2012:fig.453), b) Susuz Höyük (Bilgi 2012:fig.484), c) Kaklık Mevkii (Bilgi 2012:fig.501), d) Kaklık Mevkii (Bilgi 2012:fig.530), e) Karataş (Bilgi 2012:fig.522), f) Karataş (Mellink 1967:fig.15), g) Troy (Bilgi 2012:fig.926), h) Kültepe (Bilgi 2012:fig.511), i) Kültepe (Bilgi 2012:fig.821).

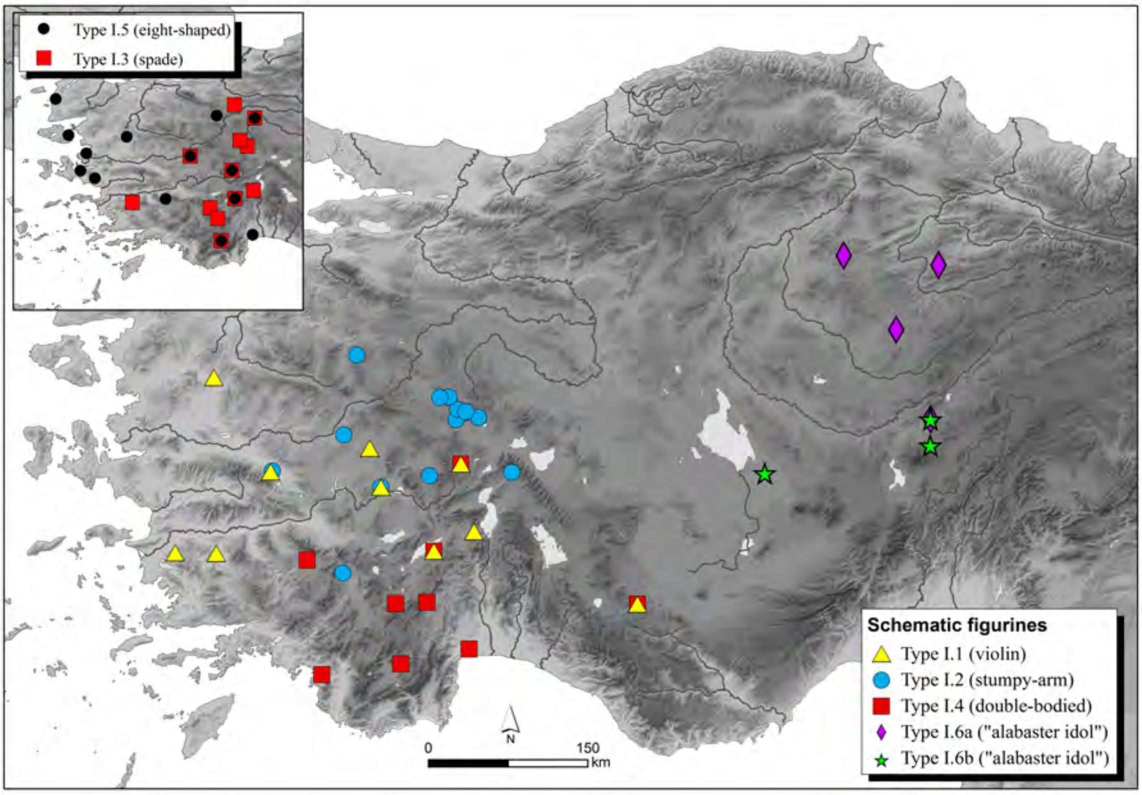


Figure 7.5. Distribution of EBA anthropomorphic "schematic style" figurines across west and central Anatolia. Types I.3 and I.5, that have a wider distribution with respect to other types, are shown separately in the inset.

Figure 7.6 EBA Anatolian anthropomorphic figurines (naturalistic style), arranged by type and at the same scale: a) Çıkrık Höyük (Bilgi2012:fig.853), b) Çaykenarı (Bilgi2012:fig.623), c) Thermi (Lamb 1936: pl.22.31-28), d) Koçumbeli (Bilgi 2012:fig.545), e) Demircihöyük-Sarıket (Seeher 2000:pl.36.295e), f) Alacahöyük (Bilgi 2012:fig.716).

Figure 7.7 EBA Anatolian anthropomorphic figurines (expressionistic style), arranged by type and at the same scale (Type III.1: a-d; Type III.2: e-i): a) Hasanoğlan (Bilgi 2012:fig.718), b) Horoztepe (Özgüç and Akok1958:pl.IX-20), c) Alacahöyük (Bilgi 2012:fig.915), d) Horoztepe (Bilgi 2012:fig.917), e-i) Kültepe (Bilgi 2012:figs.749, 843, 844, 846, 849).

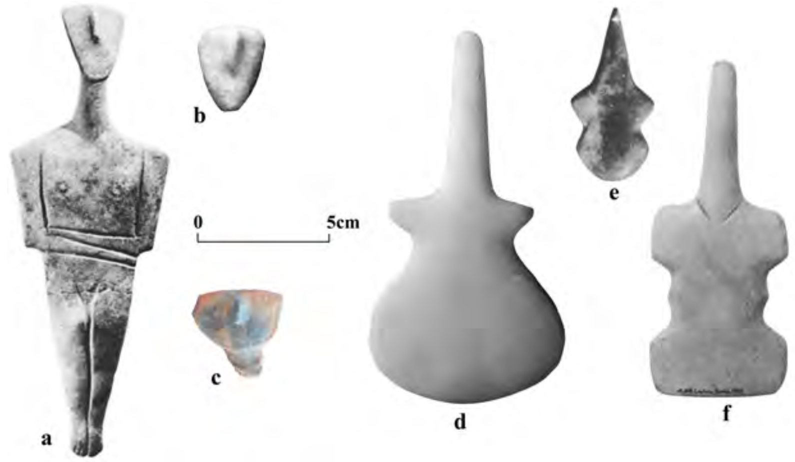


Figure 7.8 Examples of similar figurine types between Cyclades and the Büyük Menderes-Gediz triangle, at the same scale. Dokathismata-type figurines: a) Paros (Renfrew 1969:pl.5c), b) Miletus (von Grave et al. 1999:fig.11), c) Çine-Tepecik (Günel 2014:fig.8). "Violin-shaped" figurines: d) Beycesultan (Bilgi 2012: fig.453), e) Saliagos (Renfrew 1969:pl.2c), f) Paros (Renfrew 1969:pl.2e).

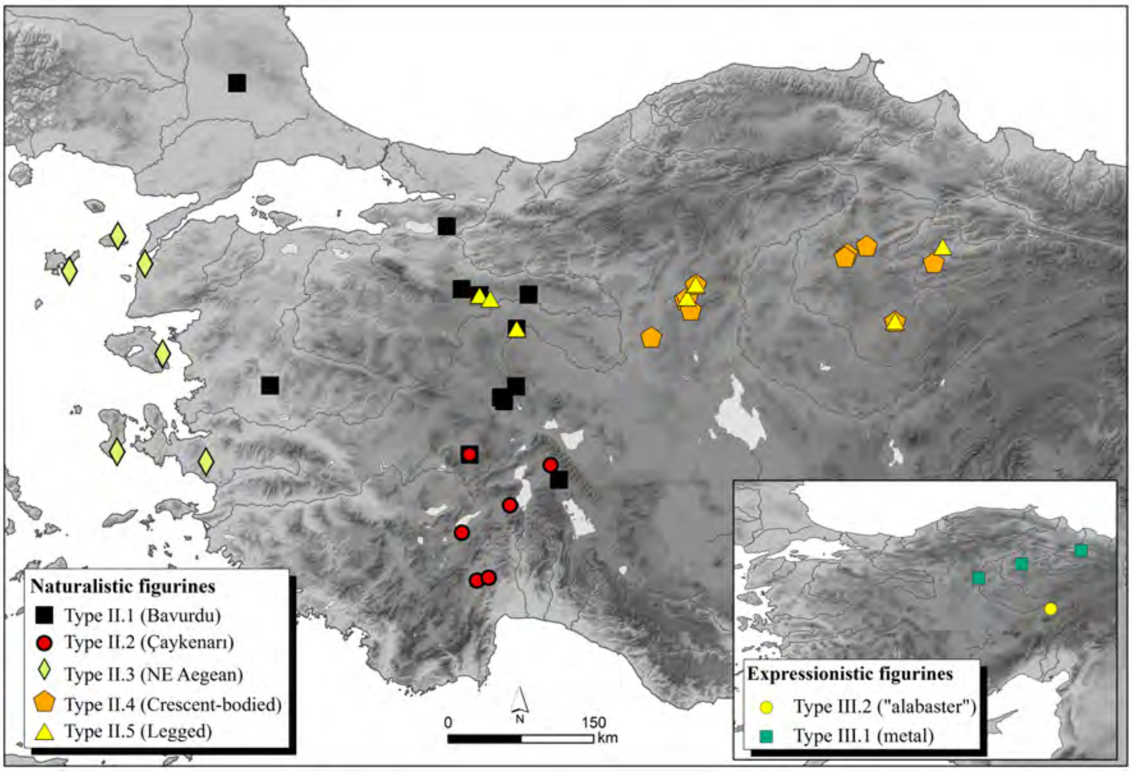


Figure 7.9. Distribution of EBA anthropomorphic figurine types II.1-II.5 (naturalistic style) and types III.1-III.2 (expressionistic types, inset).

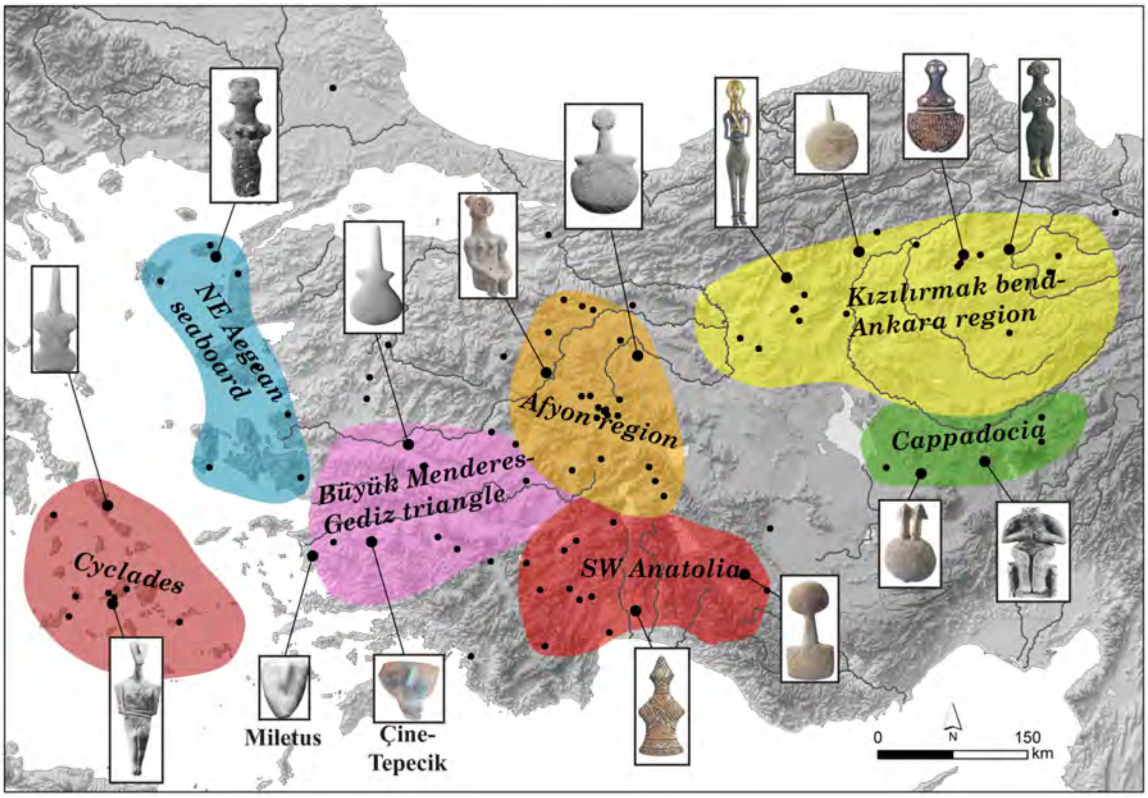


Figure 7.10. Regions defined by the distribution of one or more EBA figurine types.

	Map No.	Site	Site size	Context	Phase	Abs_date	Tot	I		II	III	IV	V	VI			Marks	Loom weight caches	Reference
								A	B					A	B	C			
Early Bronze Age	24	Alacahöyük	10ha+	domestic	levels 5-8	2600-2100 BC	27		27										Koşay 1938, 1951; Koşay and Akok 1966
	25	Alişar Höyük	18ha+	domestic	levels 12-6M	2800-1950 BC	?	3	19									"found in several groups"	von der Osten 1937a
	7	Aphrodisias	12ha	domestic	"Bronze Age 3-4"	2300-1950 BC	33	26	3		1			2	1				Sharp-Joukowsky 1986
	10	Bozüyük	2-3ha			2400-1950 BC	?			some				1	1				Koerte 1899
	5	Çeşme Bağlararası	1ha	domestic		2600-2400 BC	?				several								Vasıf Şahoğlu pers.comm.
	11	Demircihöyük	<1ha	domestic	phases E-P	2850-2600 BC	206	32		161		3	5		8		incised marks (12% of total)	some found in mixed-type groups (of 7, 28 and 33 pieces)	Obladen-Kauder 1996
	4	Emporio on Chios	1ha	domestic	levels IV-II	2800-2500 BC	5				5							all found together in room IV, single type	Hood 1982
	22	Eti Yokuşu	<1ha	domestic		2500-2200 BC	3		3										Kansu 1940
	18	Hacılar Büyük Höyük	4ha	domestic	level İTÇ 1/1	3050-2900 BC	9			9									Umurtak and Duru 2013
	9	Hacılartepe	<1ha	domestic	phase III	2850-2600 BC	2								2				Eimermann 2008
	6	Heraion on Samos	3ha	domestic		3rd mill.	1				1								Milojcic 1961
	28	İkiztepe	6ha	domestic	"Early Bronze"	3500-2800 BC	?	many	many			30+							Alkım et al.1988, 2003
	1	Kanlıgeçit	2ha	domestic	phase KG 3	2600-2500 BC	40					40						a group of 37, single type	Özdoğan and Yılmaz 2012
	8	Karahisar Höyük				2300-1950 BC	5						3	1	1				Yayalı and Akdeniz 2002
	15	Karaoğlan Mevkii	<1ha	domestic		2700-2500 BC	20	20										all found together in two burnt rooms, single type	Topbaş et al.1998
	19	Karataş	5ha	domestic	phases V-VI	2600-2300 BC	41	8		33							incised marks	different caches (5, 7 and 21), all either one type or the other	Warner 1994
	14	Keçiçayırı	<1ha	domestic		2700-2100 BC	28	12	14						2			found in three rooms, one group belonging to type Ia, two groups belonging to type Ib. Type VIb are later, found in latest EBA levels	Deniz Sarı pers.comm.
	29	Kilisetepe	2ha	domestic	phases Vj-IVa	2600-1950 BC	44	27	11						6		seal impressions (IVb)	the crescent-shaped weights are from a single group	Collon and Symington 2007
	13	Küllüoba	6ha	domestic	levels IVe-IIa	2700-1950 BC	25	some	some	some		1	some	some					Öner 2009
	16	Kusura	10ha	domestic	phase B	2700-2600 BC	1			1									Lamb 1937, 1938
	27	Maşat Höyük	8ha	domestic		late EBA	?	many											Emre 1993
	21	Polatlı	7ha	domestic	levels III ad IV	2200-1950 BC	?								several				Lloyd and Gökçe 1951
	12	Seyitömer Höyük	2ha	domestic		2800-2200 BC	16	1	5	3		1	5		1		incised marks		Çakalgöz 2000
	3	Thermi	2ha	domestic	levels III-V	2700-2500 BC	8	1		1	5			1					Lamb1936
	2	Troy	10ha	domestic/ dom.elite	phases I-IV	2850-2100 BC	98		7				90		1			in many cases found in single-type groups (of 5, 22 and 44 pieces).	Blegen et al.1950, 1951

Figure 7.11 Summary table of analysed EBA loom weight assemblages in western and central Anatolia, with details regarding the retrieval context and its relative and absolute date, the loom weight types present at each site, the presence of marks on these artefacts, information regarding object caches, and references. Site numbers refer to map in figure 7.13.

	Map No.	Site	Site size	Context	Phase	Abs_date	Tot	I		II	III	IV	V	VI			Marks	Loom weight caches	Reference
								A	B					A	B	C			
Middle Bronze Age	24	Alacahöyük	10ha+	domestic	levels 4-3	1950-1800 BC	99	5	5					8	81		seal impressions, impression of small objects (c.5% of total)	found in large quantities in several adjacent rooms (B, D1 and D4), together with amounts of spindle whorls and other weaving tools (level 4)	Çelik and Çınaroğlu 2010; Gürsan-Salzmann 1992; Koşay 1938, 1951; Koşay and Akok 1966
	25	Alişar Höyük	18ha+	domestic	"Hittite"	1950-1650 BC	?	some							21+		seal impressions (35% of total)		von der Osten 1937b
	7	Aphrodisias	12ha	domestic		1950-1650 BC	13	1						1	11				Sharp-Joukowsky 1986
	17	Beycesultan	25ha+	"Palace"	levels V-II	1950-1400 BC	64			20				3		41	seal impressions, other impressions	17 pyramidal found together in room 10, 31 crescent-shaped found together in jar. Only type VIc are marked	Mellaart and Murray 1995
	11	Demircihöyük	<1ha	domestic	phases IV-II	1850-1650 BC	74							1	73		incised marks, other impression	23 out of 74 are marked (31%), only one made by pin-head in the shape of rosette	Kull 1988
	23	Kaman-Kalehöyük	10ha+		phase III	1950-1300 BC	8	2		1				1	3	1			museum exhibition
	8	Karahisar Höyük				1950-1650 BC	1								1		seal impression		Yayalı and Akdeniz 2002
	20	Karahöyük-Konya	50ha+	"Palace"		1950-1800 BC	310								many		seal impressions, other impressions, incised decorations	one group has 70 pieces	Alp 1968
	26	Kültepe	180ha+	domestic	level II-I	1950-1800 BC	30	some						many	many		seal impressions		Özgüç 1986
	16	Kusura	12ha	domestic	phase C	2100-1800 BC	32			2						30	seal impressions	found together in a group	Lamb 1937, 1938
	2	Troy	10ha+	domestic	level VI	1900-1600 BC	6				6								Blegen et al.1958

Figure 7.11 Summary table of analysed MBA loom weight assemblages in western and central Anatolia, with details regarding the retrieval context and its relative and absolute date, the loom weight types present at each site, the presence of marks on these artefacts, information regarding object caches, and references. Site numbers refer to map in figure 7.13.

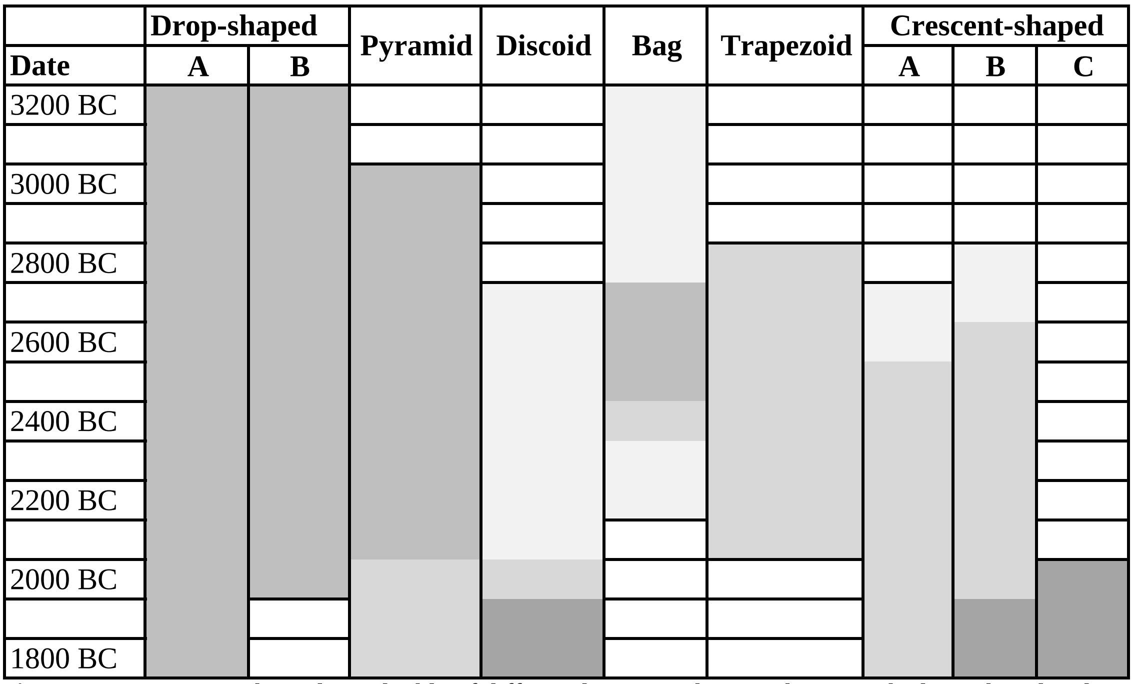


Figure 7.12. Synoptic chronological table of different loom weight types between the late 4th and early 2nd millennium BC, and the occurrence of marks on them. Different shades of gray indicate the relative frequency in each period.

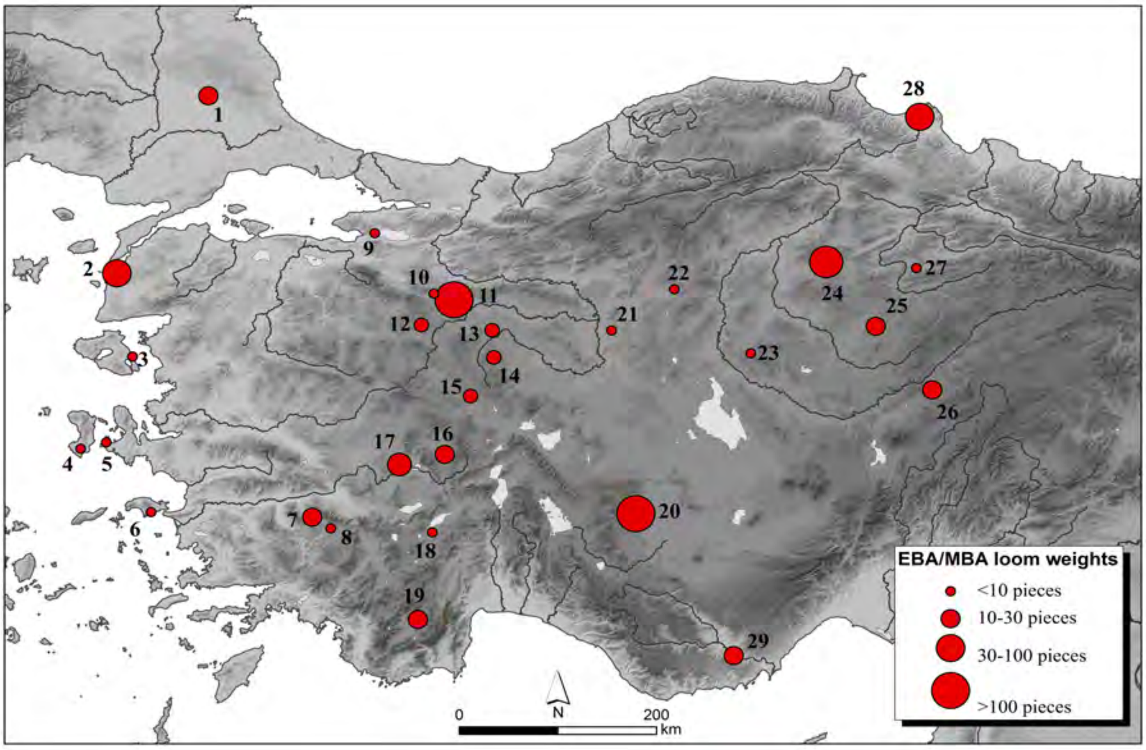


Figure 7.13. Map showing the location of analysed EBA and MBA loom weight-yielding sites. Site numbers refer to table in figure 7.11.

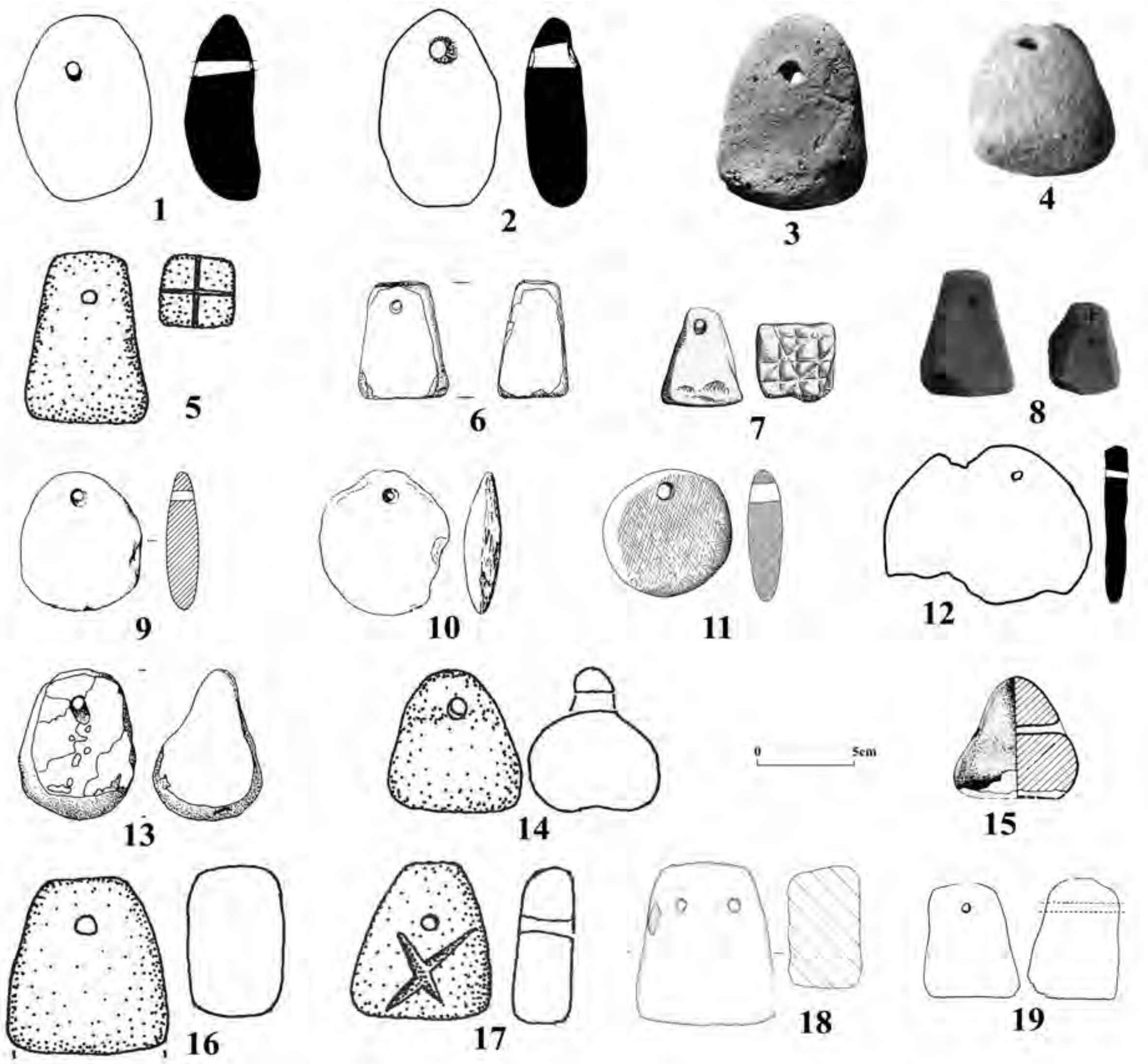


Figure 7.14. Examples of EBA Anatolian loom weight types (I-V), at the same scale. Drop-shaped (type I.a): 1) Aphrodisias (Sharp-Joukowsky 1986:fig.423.17), 2) Aphrodisias (Sharp-Joukowsky 1986:fig.431.2). Drop-shaped (type I.b): 3) Troy (Blegen et al.1951:fig.150.37-285), 4) Karataş (Warner 1994:pl.195a). Pyramidal (type 2): 5) Seyitömer Höyük (Çakalgöz 2000:pl.44.131), 6) Küllüoba (Öner 2009:pl.16c), 7) Kusura (Lamb 1938:fig.19.2), 8) Karataş (Warner 1994:pl.196a). Discoid (type III): 9) Emporio (Hood 1982:fig.285.28), 10) Heraion (Milojcic 1961:pl.49.1), 11) Thermi (Lamb 1936:fig.44.31-31), 12) Aphrodisias (Sharp-Joukowski 1986:fig.431.36). Bag-shaped (type IV): 13) Küllüoba (Öner 2009:pl.16a), 14) Seyitömer Höyük (Çakalgöz 2000:pl.44.134), 15) İkiztepe (Alkım et al.1988:pl.40.29). Trapezoid type (type V): 16) Seyitömer Höyük (Çakalgöz 2000:pl.44.121), 17) Seyitömer Höyük (Çakalgöz 2000:pl.44.132), 18) Küllüoba (Öner 2009:pl.15b), 19) Karahisar (Yayalı and Akdeniz 2002:pl.16.73).

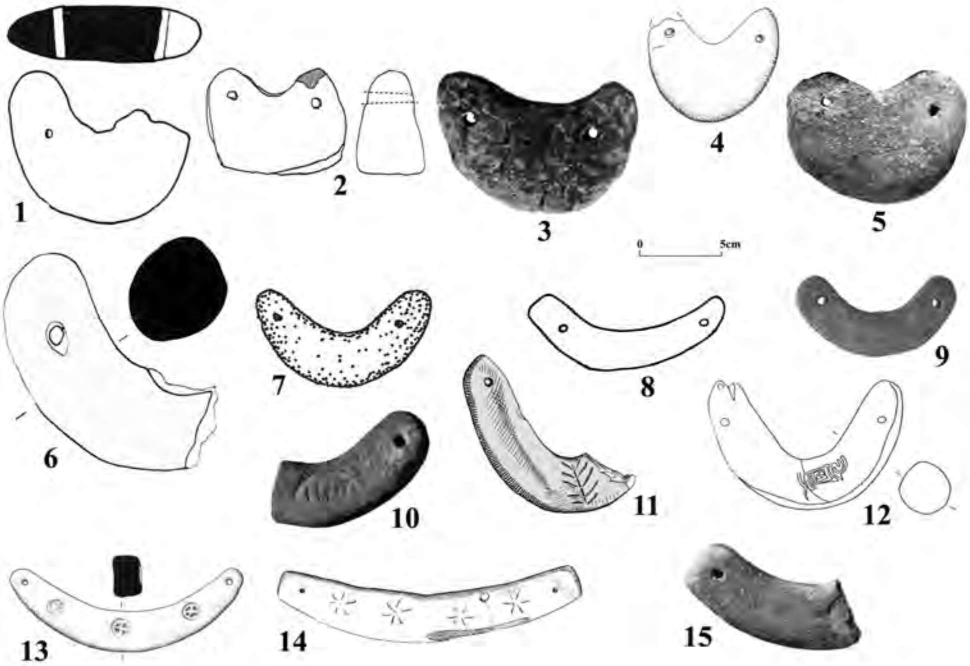


Figure 7.15 Examples of EBA (1-3, 6-8) and MBA(4-5, 9-15) Anatolian loom weights (type VI), at the same scale. Crescent-shaped (type VI.a): 1) Aphrodisias (Sharp-Joukowski 1986:fig.412.10), 2) Karahisar (Yayalı and Akdeniz 2002:pl.16.72), 3) Thermi (Lamb 1936:pl.XXIV.31-61), 4) Beycesultan (Mellaart and Murray 1995:fig.O27.241), 5) Alacahöyük (Koşay and Akok 1966:pl.21.57). Crescent-shaped (type VI.b): 6) Aphrodisias (Sharp-Joukowski 1986:fig.418.9), 7) Seyitömer Höyük (Çakalgöz 2000:pl.44.135), 8) Hacılartepe (Eimermann 2008:fig.24.12), 9) Alacahöyük (Koşay and Akok 1966:pl.21.60), 10) Alişar Höyük (von der Osten 1937b:fig.300.e1468), 11) Kusura (Lamb 1938:fig.19.4), 12) Karahisar (Yayalı and Akdeniz 2002:pl.16.76). Crescent-shaped (type VI.c): 13) Beycesultan (Mellaart and Murray 1995:fig.O15.170), 14) Kusura (Lamb 1937:fig.15.2), 15) Alişar Höyük (von der Osten 1937b:fig.300.e1451).

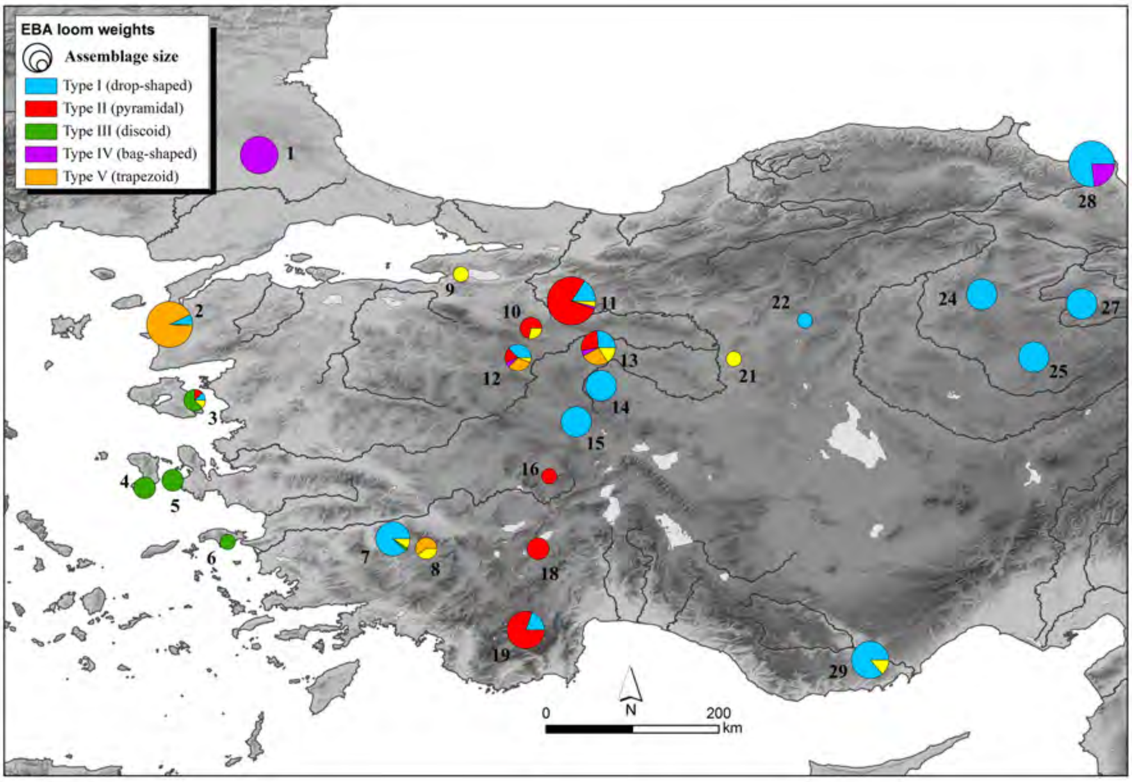


Figure 7.16 Map showing the distribution of different EBA loom weight types across western and central Anatolia. Different symbol sizes represent the size of the total loom weight assemblages. Site numbers refer to table in figure 7.11.

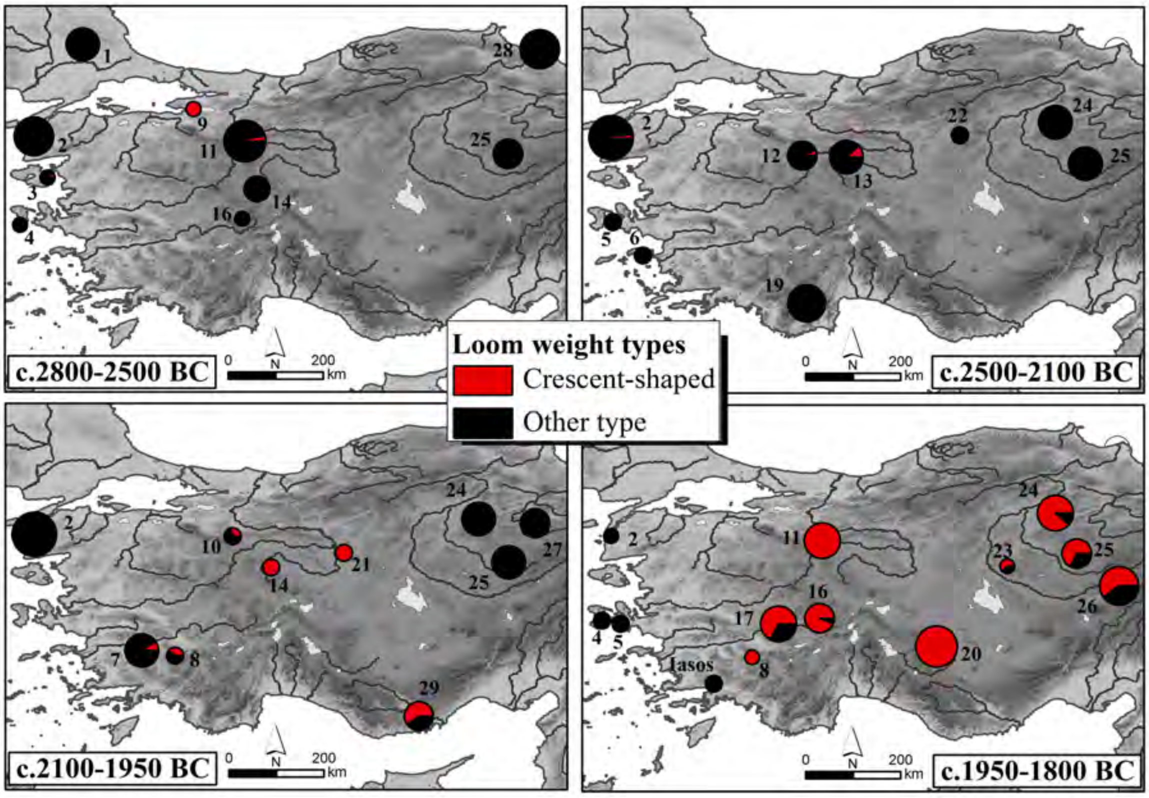


Figure 7.17. Maps showing the diffusion of type VI (crescent-shaped) loom weights in different phases of the 3rd and early 2nd millennia BC. Site numbers refer to table in figure 7.11.

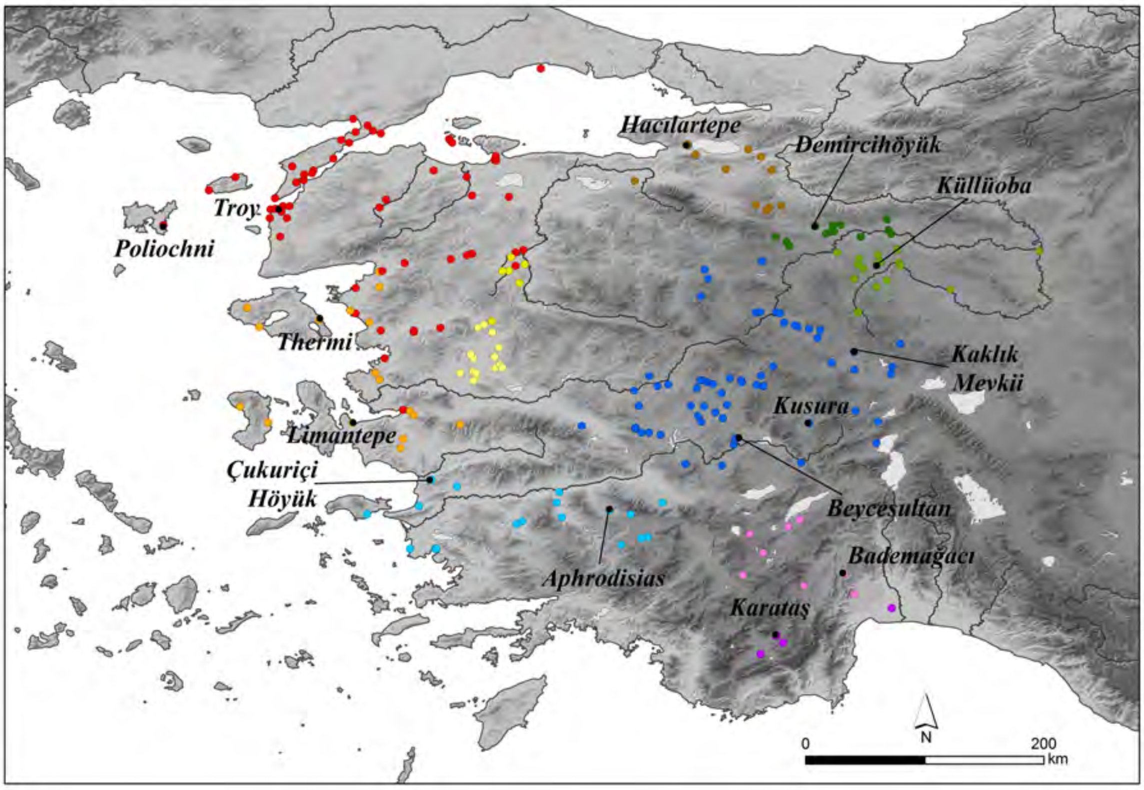


Figure 7.18. Map showing “EB I pottery groups” (c.3200-2800 BC) identified in western Anatolia by Deniz Sarı: each dot represents a single site, and different colours represent affiliation to a particular “pottery group”. The names of the major excavated sites with levels belonging to this period are also included. Data courtesy of Deniz Sarı.

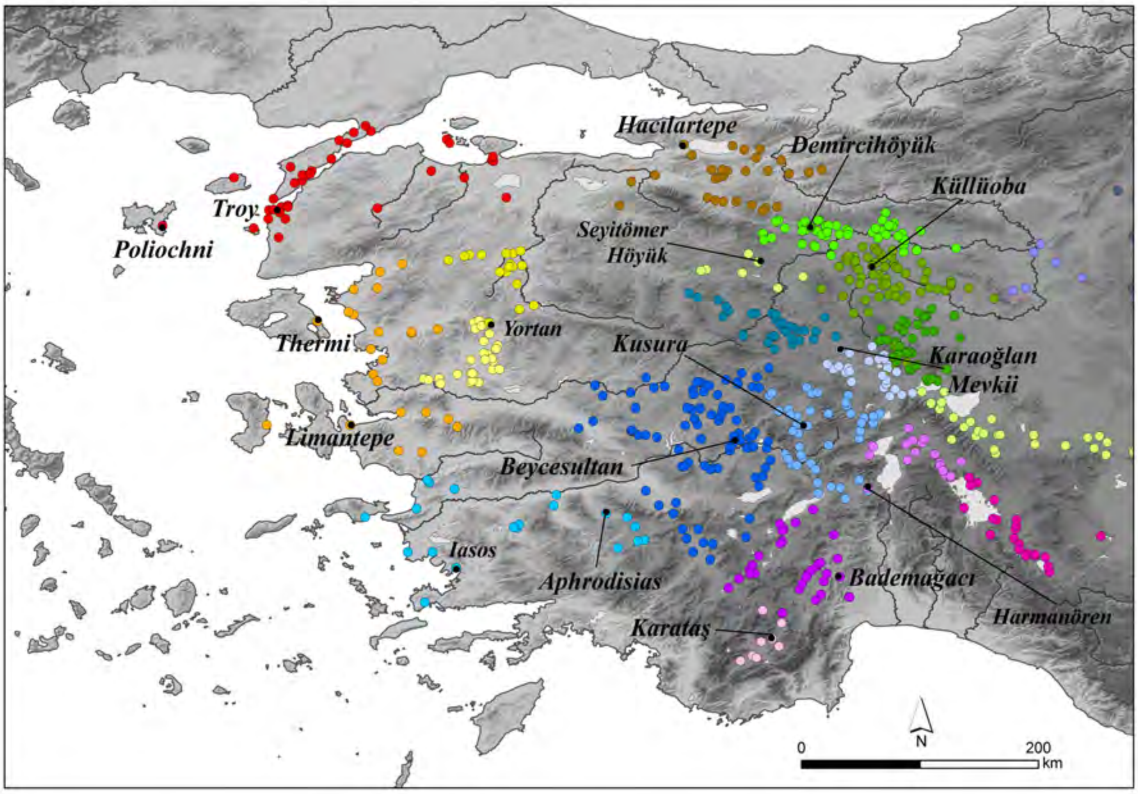


Figure 7.19. Map showing "EB II pottery groups" (c.2800-2400 BC) identified in western Anatolia by Deniz Sarı: each dot represents a single site, and different colours represent affiliation to a particular "pottery group". The names of the major excavated sites with levels belonging to this period are also included. Data courtesy of Deniz Sarı.

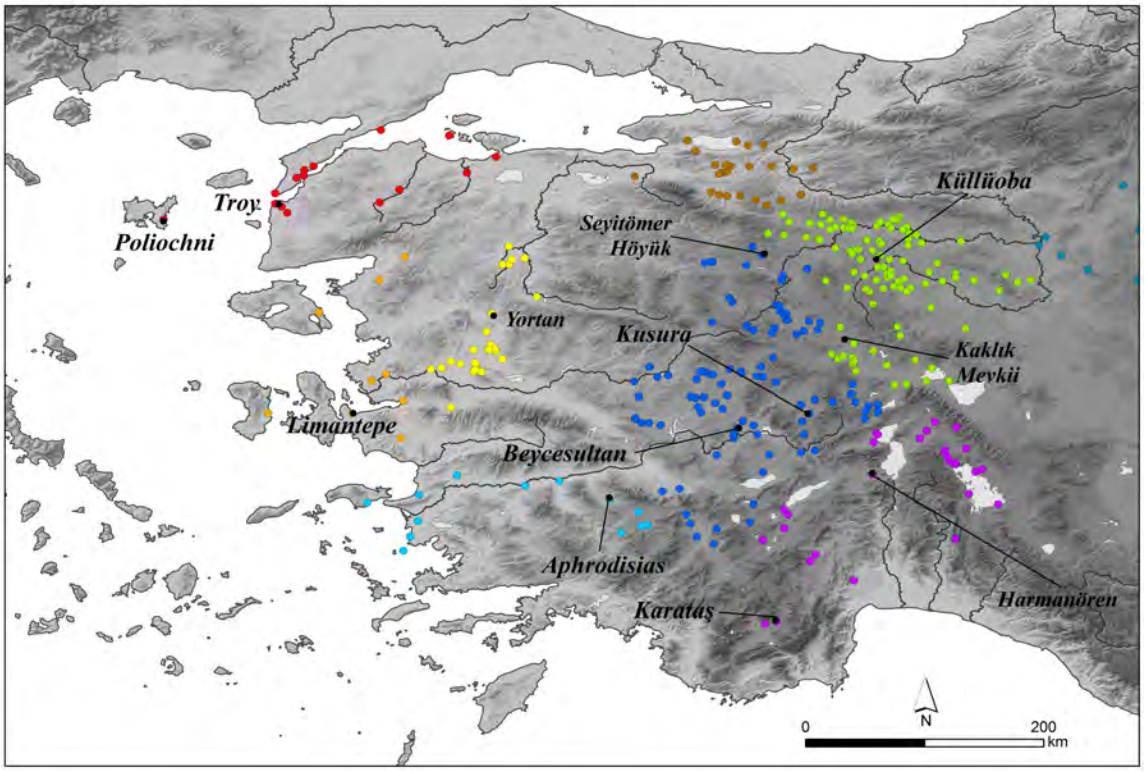


Figure 7.20. Map showing "EB III pottery groups" (c.2400-2000 BC) identified in western Anatolia by Deniz Sarı: each dot represents a single site, and different colours represent affiliation to a particular "pottery group". The names of the major excavated sites with levels belonging to this period are also included. Data courtesy of Deniz Sarı.

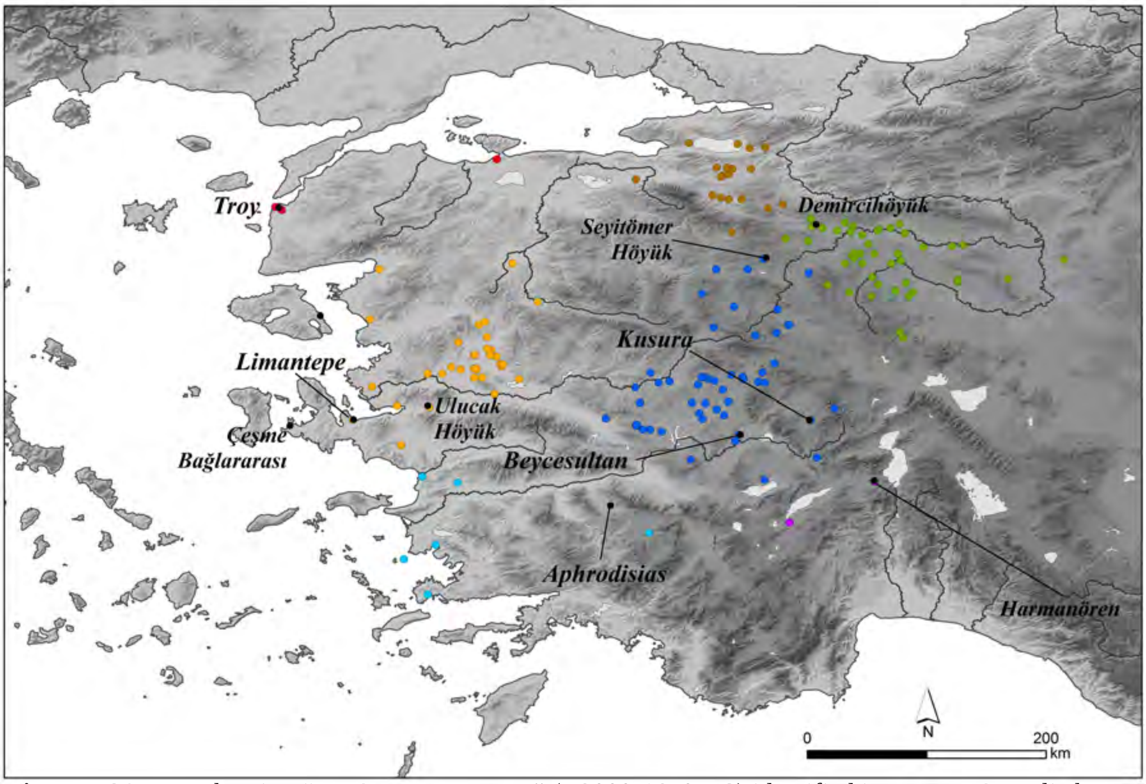


Figure 7.21. Map showing "MBA pottery groups" (c.2000-1650 BC) identified in western Anatolia by Deniz Sarı: each dot represents a single site, and different colours represent affiliation to a particular "pottery group". The names of the major excavated sites with levels belonging to this period are also included. Data courtesy of Deniz Sarı.

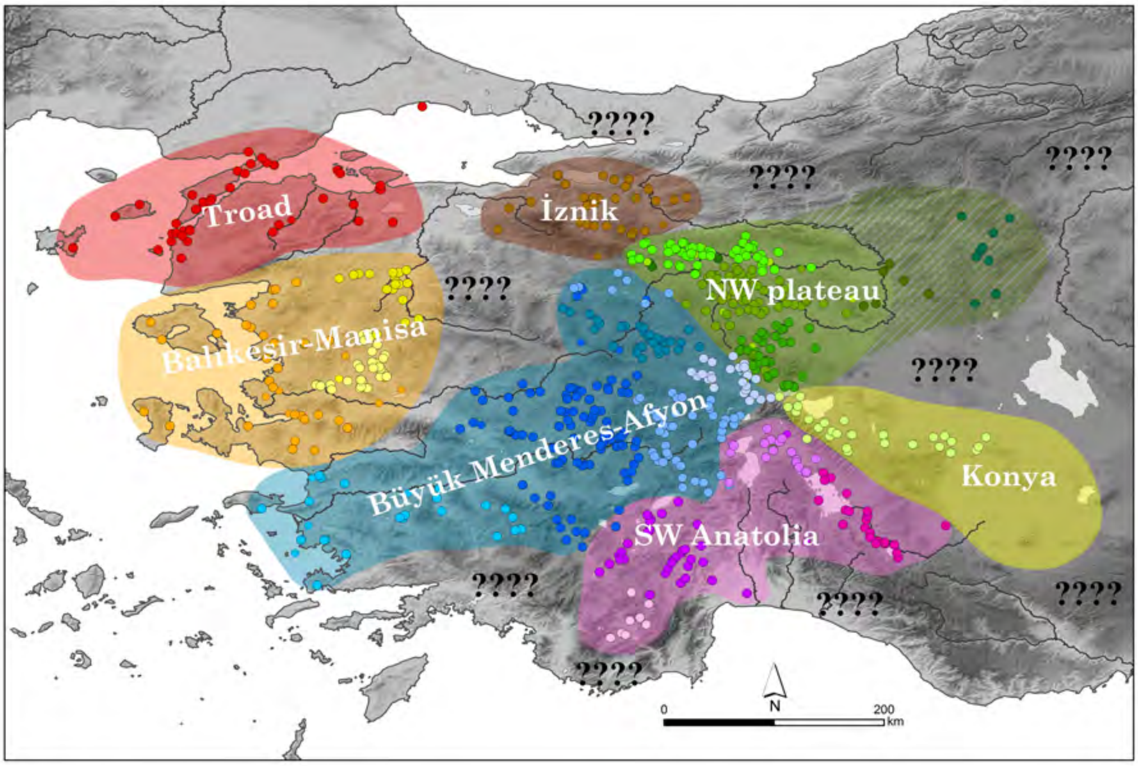


Figure 7.22. Map showing the "cultural regions" in western Anatolia and the western section of the central Anatolian plateau, as identified by Deniz Sarı based on pottery and figurine traditions from the late 4th to the early 2nd millennia BC. Also plotted are all analysed sites belonging to the same period, with colours representing different "pottery groups".

Period	No. stratigraphic pillars	No. sites	No. "pottery groups"	Average "pottery group" area (in km2)
EB I	7	217	10	8090
EB II	11	750	19	4120
EB III	7	406	9	11360
MBA	3	169	7	11580

a)

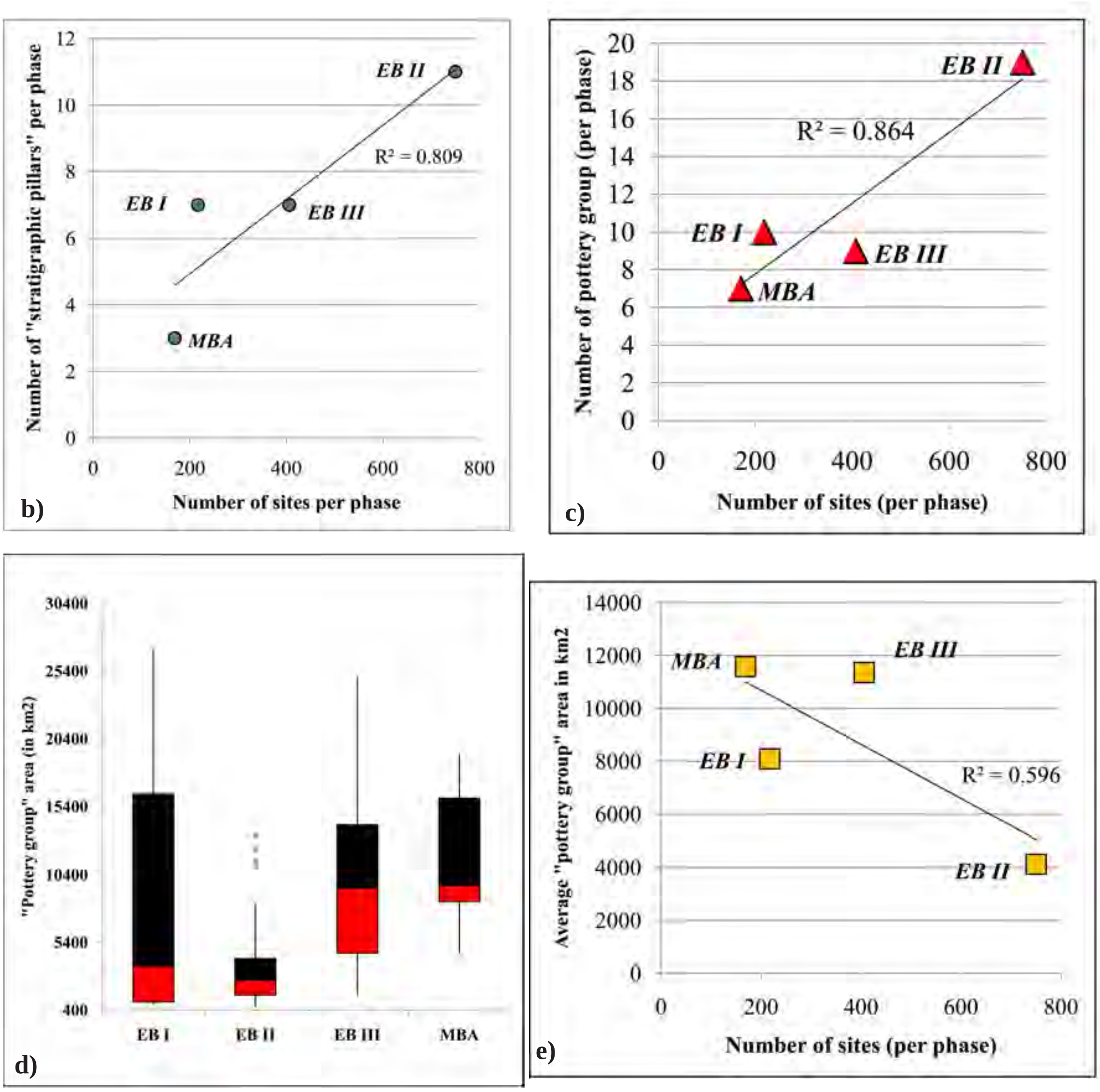


Figure 7.23. Analysis of Sarı's ceramic assemblages dataset: a) summary table indicating, for each of her phases, the number of "stratigraphic pillars" with excavated levels belonging to that phase (cf. section 1.4.1 for the term), the total number of sites analysed, the total number of identifiable "pottery groups", and the average extent (in km2) of the "pottery groups"; b) chart showing the positive correlation between the number of "stratigraphic pillars" and the number of identified sites, in each of the four phases; c) chart showing the positive correlation between the number of "pottery groups" identified in each phase and the number of sites for the same phase; d) box and whiskers plot showing the range of "pottery groups" areas (in km2), for each phase; e) chart showing the negative correlation between the average "pottery group" area (in km2) for each phase, and the number of recognised sites.

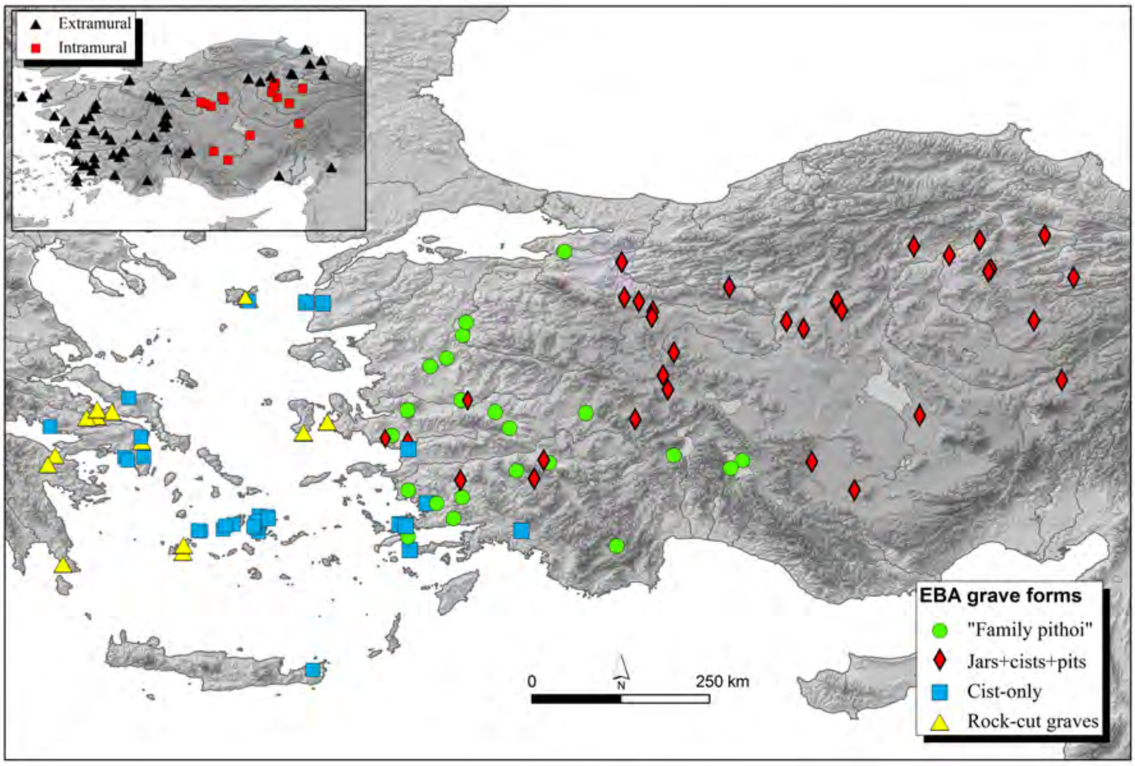


Figure 7.24. Map showing the distribution of main grave types and grave type combinations across western/ central Anatolia and the Aegean during the Early Bronze Age. NB: Cretan tholos graves and Aegean corbelled tombs have been omitted since they are not represented in Anatolia. Inset shows the distribution of extramural and intramural cemeteries in EBA western and central Anatolia.

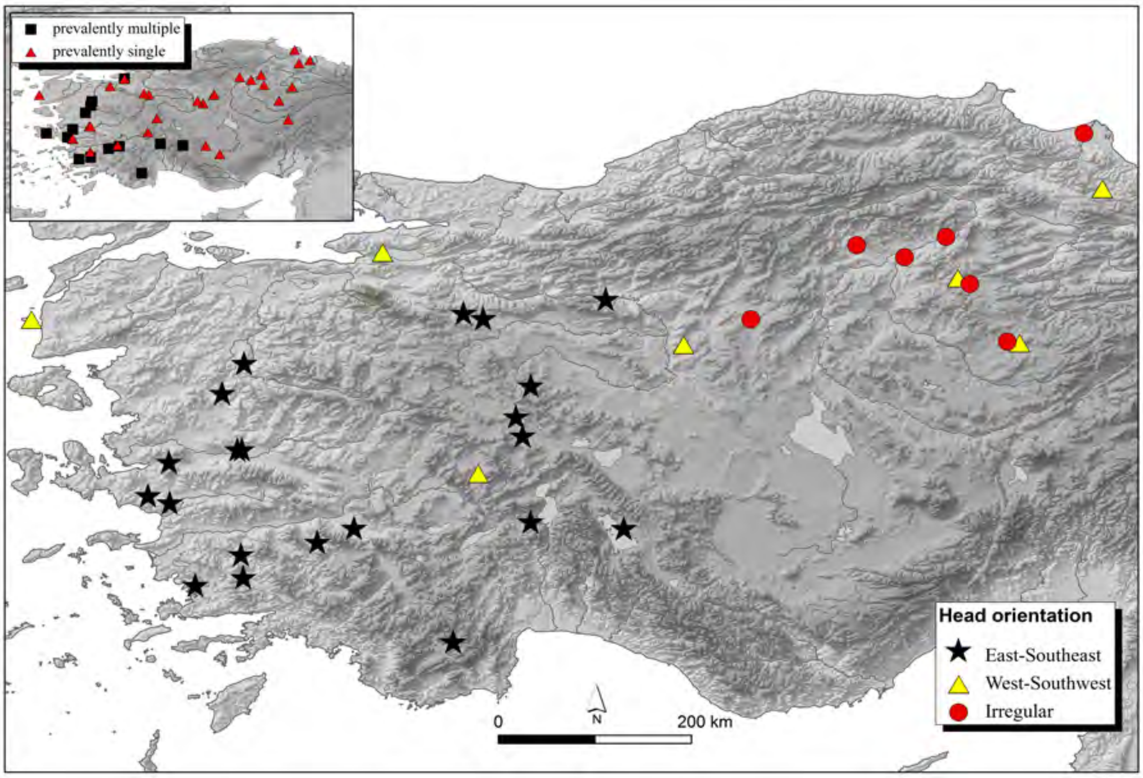


Figure 7.25. Map showing the normative orientation of the interments' head across EBA western and central Anatolian cemeteries. Inset shows the distribution of (prevalently) single vs. (prevalently) multiple burials within a single grave across EBA cemeteries.

Early Bronze Age

Map No.	Site	Site size	Context	Phase	Abs_date	Tot	I A	I B	II	III	IV	V	VI A	VI B	VI C	Marks	Loom weight caches	Reference
24	Alacahöyük	10ha+	domestic	levels 5-8	2600-2100 BC	27		27										Koşay 1938, 1951; Koşay and Akok 1966
25	Alişar Höyük	18ha+	domestic	levels 12-6M	2800-1950 BC	?	3	19									"found in several groups"	von der Osten 1937a
7	Aphrodisias	12ha	domestic	"Bronze Age 3-4"	2300-1950 BC	33	26	3		1			2	1				Sharp-Joukowsky 1986
10	Bozüyük	2-3ha			2400-1950 BC	?			some				1	1				Koerte 1899
5	Çeşme Bağlararası	1ha	domestic		2600-2400 BC	?				several								Vasıf Şahoğlu pers.comm.
11	Demircihöyük	<1ha	domestic	phases E-P	2850-2600 BC	206	32		161		3	5		8		incised marks (12% of total)	some found in mixed-type groups (of 7, 28 and 33 pieces)	Obladen-Kauder 1996
4	Emporio on Chios	1ha	domestic	levels IV-II	2800-2500 BC	5				5							all found together in room IV, single type	Hood 1982
22	Eti Yokuşu	<1ha	domestic		2500-2200 BC	3		3										Kansu 1940
18	Hacılar Büyük Höyük	4ha	domestic	level İTÇ 1/1	3050-2900 BC	9			9									Umurtak and Duru 2013
9	Hacılartepe	<1ha	domestic	phase III	2850-2600 BC	2								2				Eimermann 2008
6	Heraion on Samos	3ha	domestic		3rd mill.	1				1								Milojcic 1961
28	İkiztepe	6ha	domestic	"Early Bronze"	3500-2800 BC	?	many	many			30+							Alkım et al.1988, 2003
1	Kanlıgeçit	2ha	domestic	phase KG 3	2600-2500 BC	40					40						a group of 37, single type	Özdoğan and Yılmaz 2012
8	Karahisar Höyük				2300-1950 BC	5						3	1	1				Yayalı and Akdeniz 2002
15	Karaoğlan Mevkii	<1ha	domestic		2700-2500 BC	20	20										all found together in two burnt rooms, single type	Topbaş et al.1998
19	Karataş	5ha	domestic	phases V-VI	2600-2300 BC	41	8		33							incised marks	different caches (5, 7 and 21), all either one type or the other	Warner 1994
14	Keçiçayırı	<1ha	domestic		2700-2100 BC	28	12	14						2			found in three rooms, one group belonging to type Ia, two groups belonging to type Ib. Type VIb are later, found in latest EBA levels	Deniz Sarı pers.comm.
29	Kilisetepe	2ha	domestic	phases Vj-IVa	2600-1950 BC	44	27	11						6		seal impressions (IVb)	the crescent-shaped weights are from a single group	Collon and Symington 2007
13	Küllüoba	6ha	domestic	levels IVe-IIa	2700-1950 BC	25	some	some	some		1	some	some					Öner 2009
16	Kusura	10ha	domestic	phase B	2700-2600 BC	1			1									Lamb 1937, 1938
27	Maşat Höyük	8ha	domestic		late EBA	?	many											Emre 1993
21	Polatlı	7ha	domestic	levels III ad IV	2200-1950 BC	?								several				Lloyd and Gökçe 1951
12	Seyitömer Höyük	2ha	domestic		2800-2200 BC	16	1	5	3		1	5		1		incised marks		Çakalgöz 2000
3	Thermi	2ha	domestic	levels III-V	2700-2500 BC	8	1		1	5			1					Lamb1936
2	Troy	10ha	domestic/ dom.elite	phases I-IV	2850-2100 BC	98		7				90		1			in many cases found in single-type groups (of 5, 22 and 44 pieces).	Blegen et al.1950, 1951

Figure 7.11 Summary table of analysed EBA loom weight assemblages in western and central Anatolia, with details regarding the retrieval context and its relative and absolute date, the loom weight types present at each site, the presence of marks on these artefacts, information regarding object caches, and references. Site numbers refer to map in figure 7.13.

	Map No.	Site	Site size	Context	Phase	Abs_date	Tot	I		II	III	IV	V	VI			Marks	Loom weight caches	Reference
								A	B					A	B	C			
Middle Bronze Age	24	Alacahöyük	10ha+	domestic	levels 4-3	1950-1800 BC	99	5	5					8	81		seal impressions, impression of small objects (c.5% of total)	found in large quantities in several adjacent rooms (B, D1 and D4), together with amounts of spindle whorls and other weaving tools (level 4)	Çelik and Çınaroğlu 2010; Gürsan-Salzmann 1992; Koşay 1938, 1951; Koşay and Akok 1966
	25	Alişar Höyük	18ha+	domestic	"Hittite"	1950-1650 BC	?	some							21+		seal impressions (35% of total)		von der Osten 1937b
	7	Aphrodisias	12ha	domestic		1950-1650 BC	13	1						1	11				Sharp-Joukowsky 1986
	17	Beycesultan	25ha+	"Palace"	levels V-II	1950-1400 BC	64			20				3		41	seal impressions, other impressions	17 pyramidal found together in room 10, 31 crescent-shaped found together in jar. Only type VIc are marked	Mellaart and Murray 1995
	11	Demircihöyük	<1ha	domestic	phases IV-II	1850-1650 BC	74							1	73		incised marks, other impression	23 out of 74 are marked (31%), only one made by pin-head in the shape of rosette	Kull 1988
	23	Kaman-Kalehöyük	10ha+		phase III	1950-1300 BC	8	2		1				1	3	1			museum exhibition
	8	Karahisar Höyük				1950-1650 BC	1								1		seal impression		Yayalı and Akdeniz 2002
	20	Karahöyük-Konya	50ha+	"Palace"		1950-1800 BC	310								many		seal impressions, other impressions, incised decorations	one group has 70 pieces	Alp 1968
	26	Kültepe	180ha+	domestic	level II-I	1950-1800 BC	30	some						many	many		seal impressions		Özgüç 1986
	16	Kusura	12ha	domestic	phase C	2100-1800 BC	32			2						30	seal impressions	found together in a group	Lamb 1937, 1938
	2	Troy	10ha+	domestic	level VI	1900-1600 BC	6				6								Blegen et al.1958

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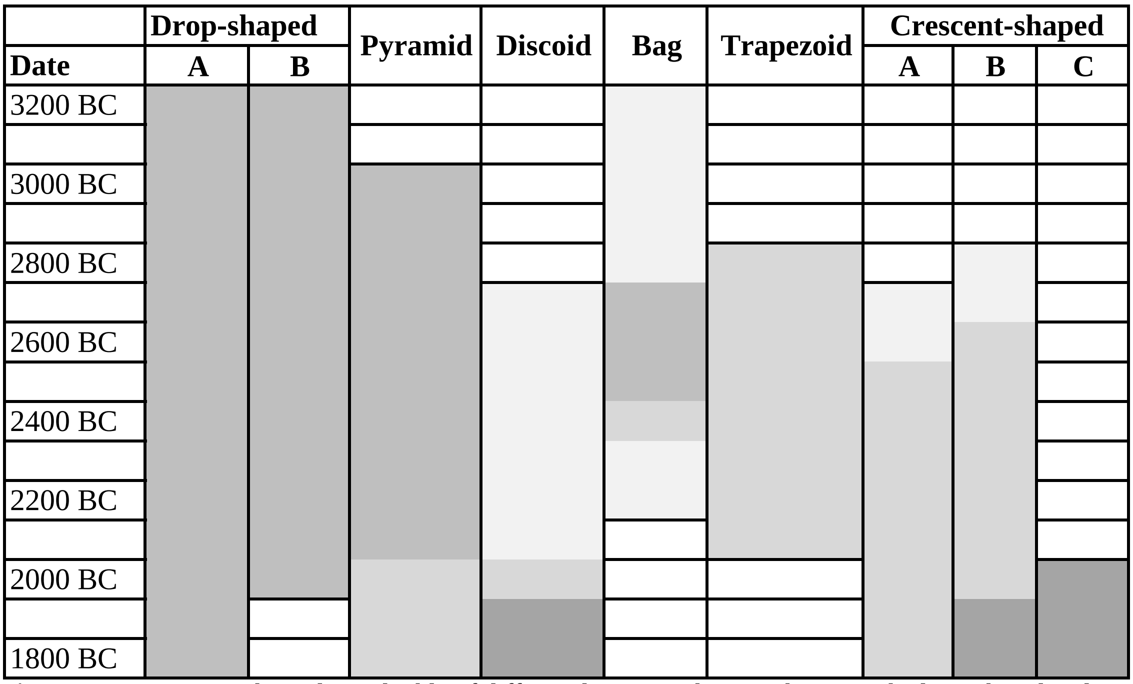

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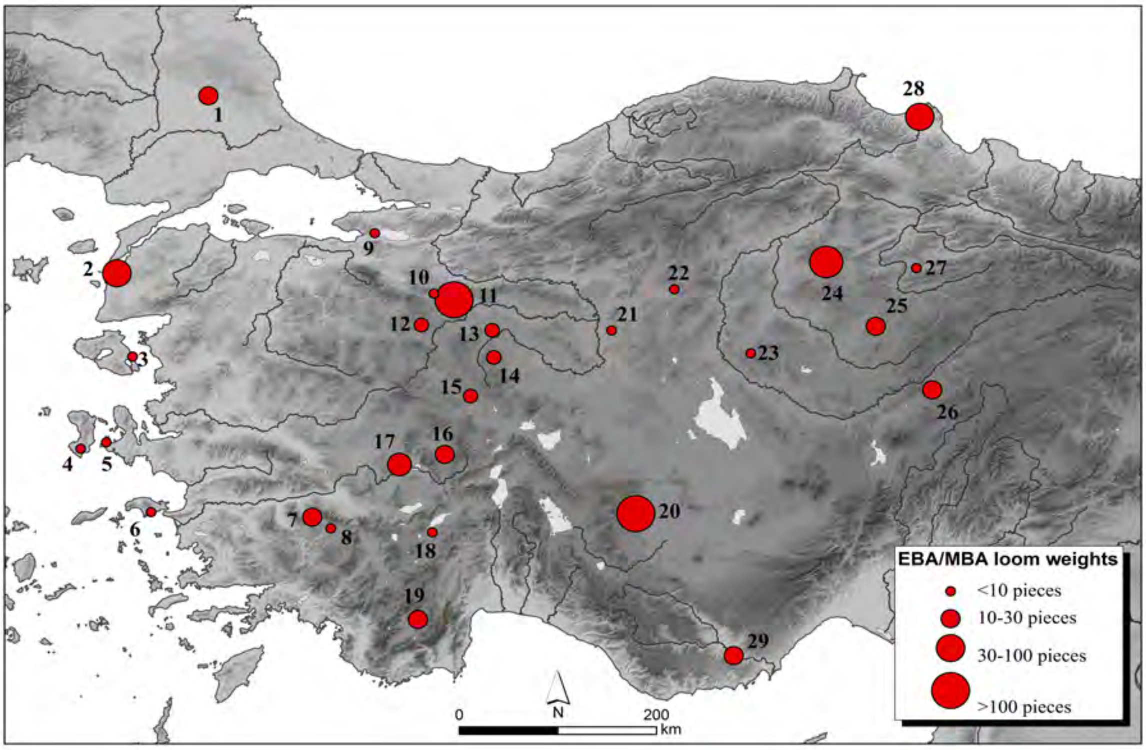

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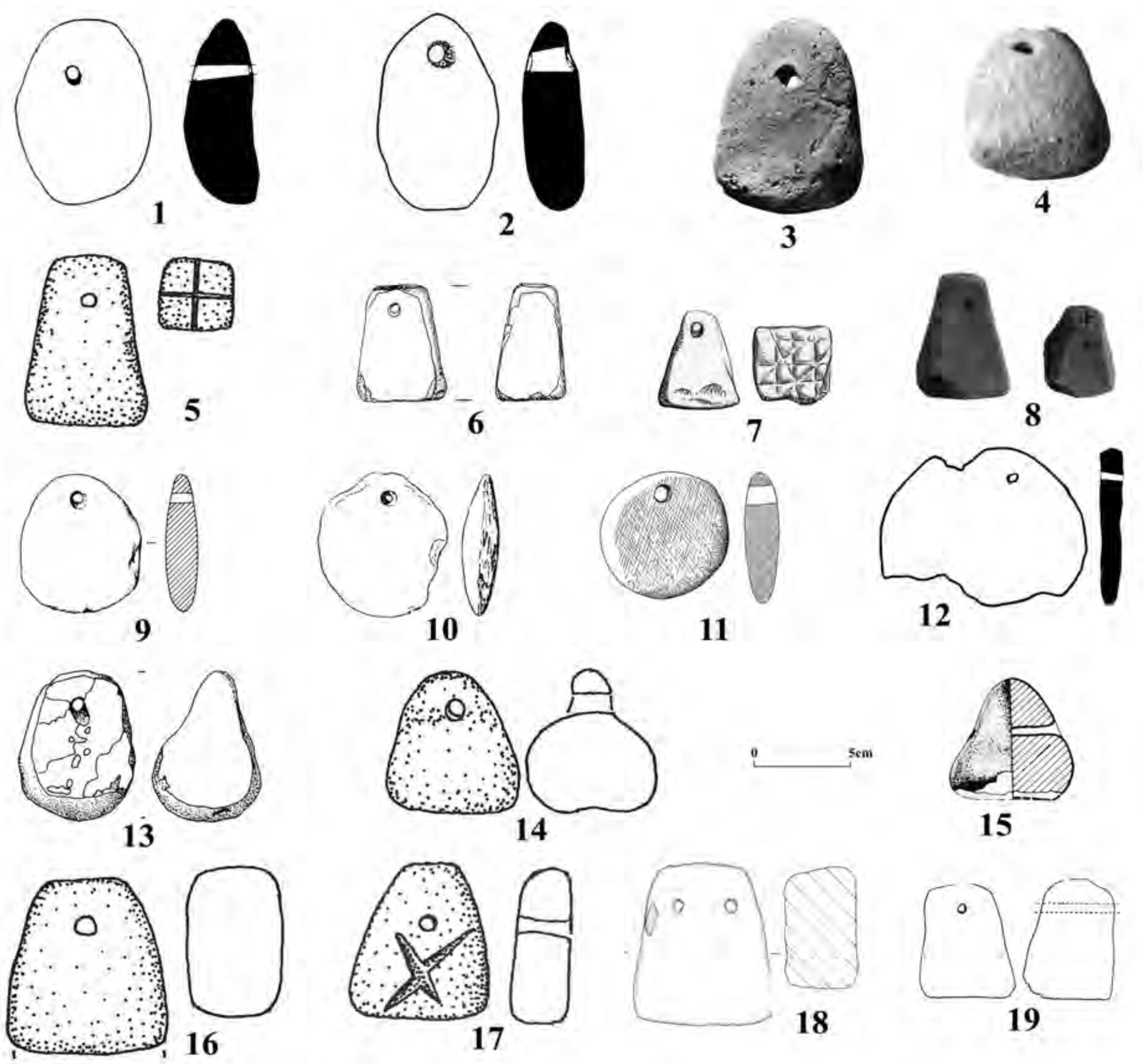

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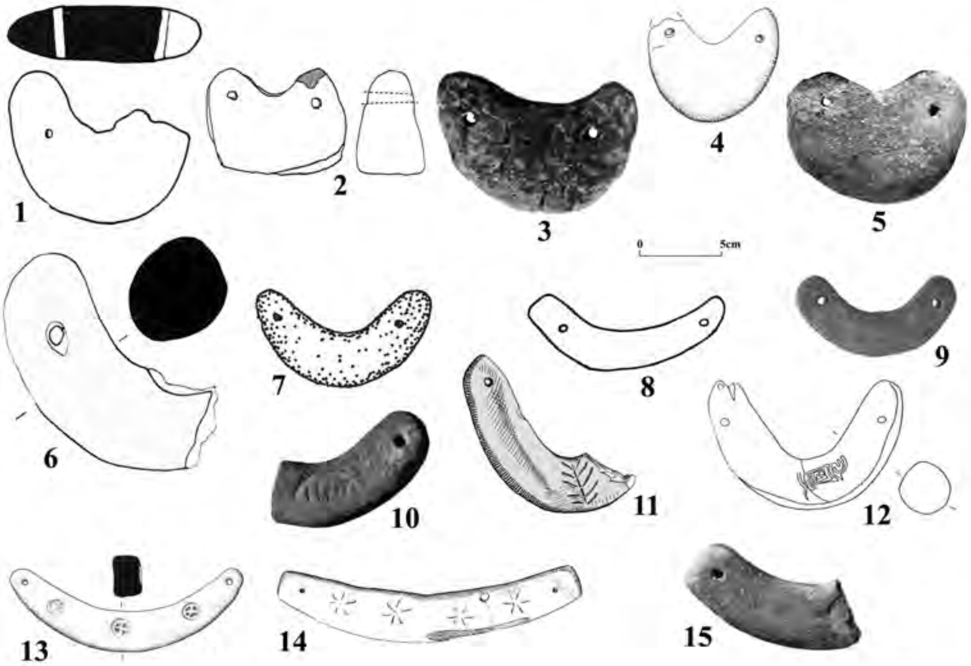

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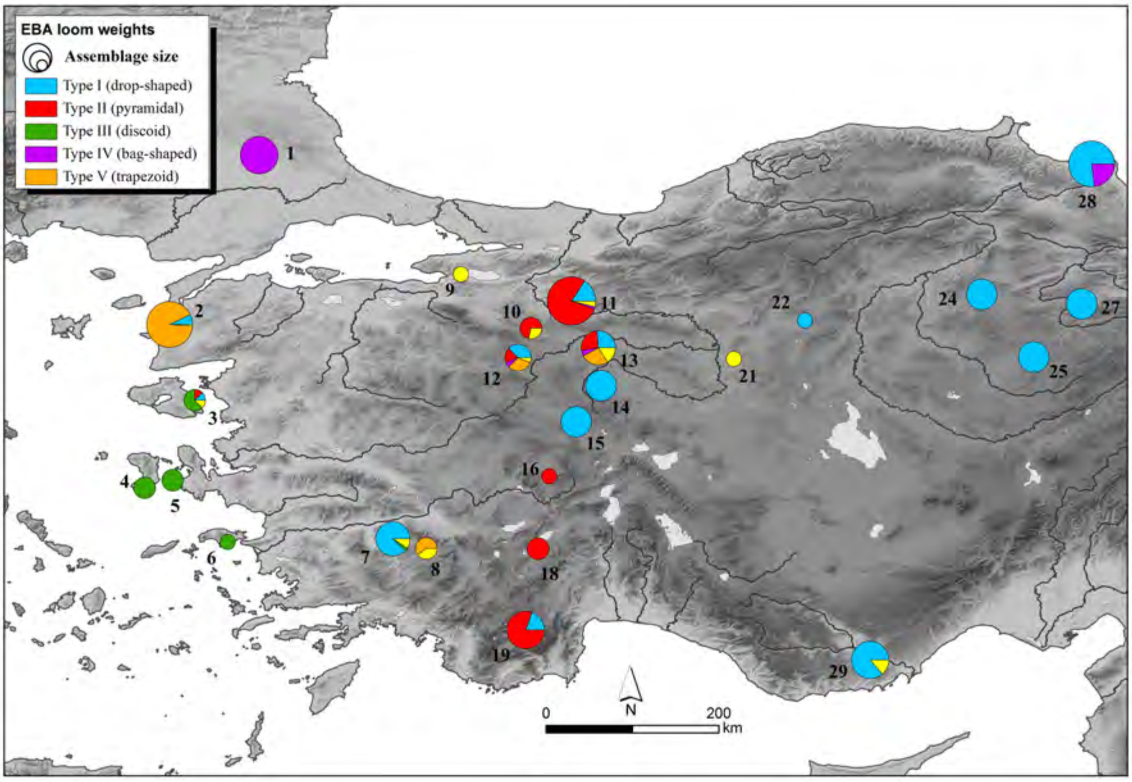

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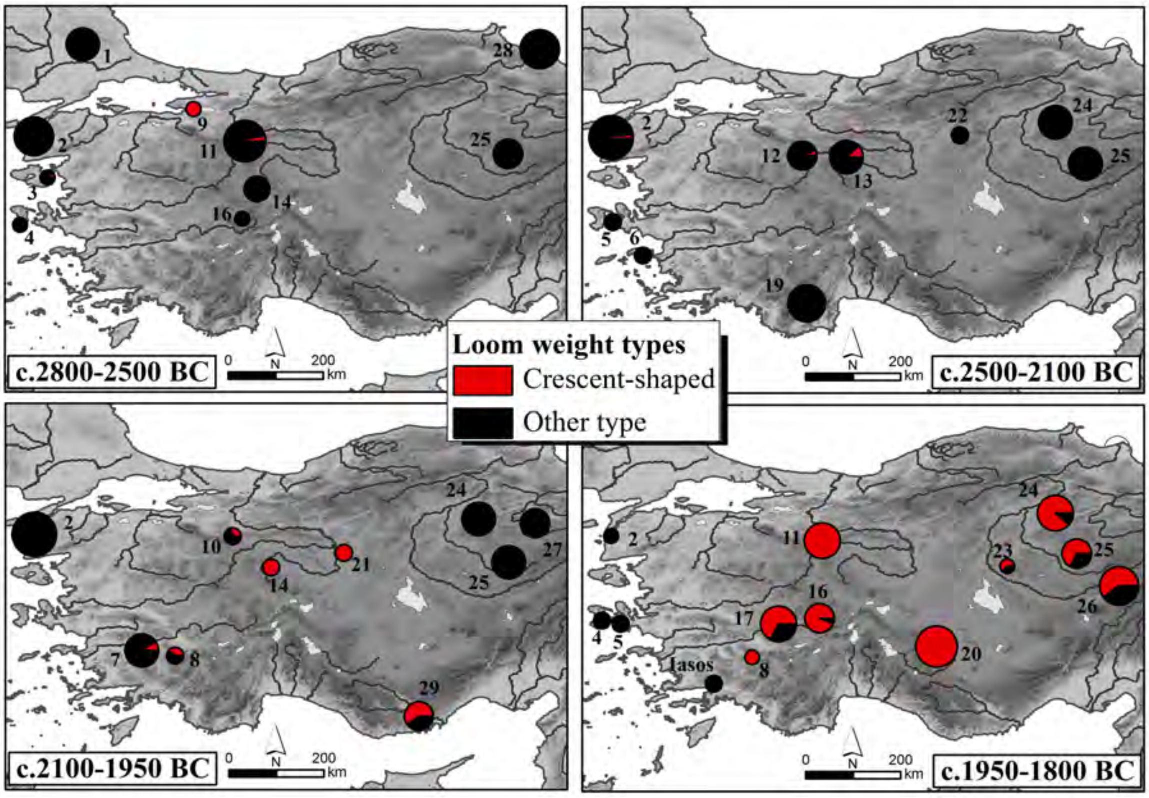

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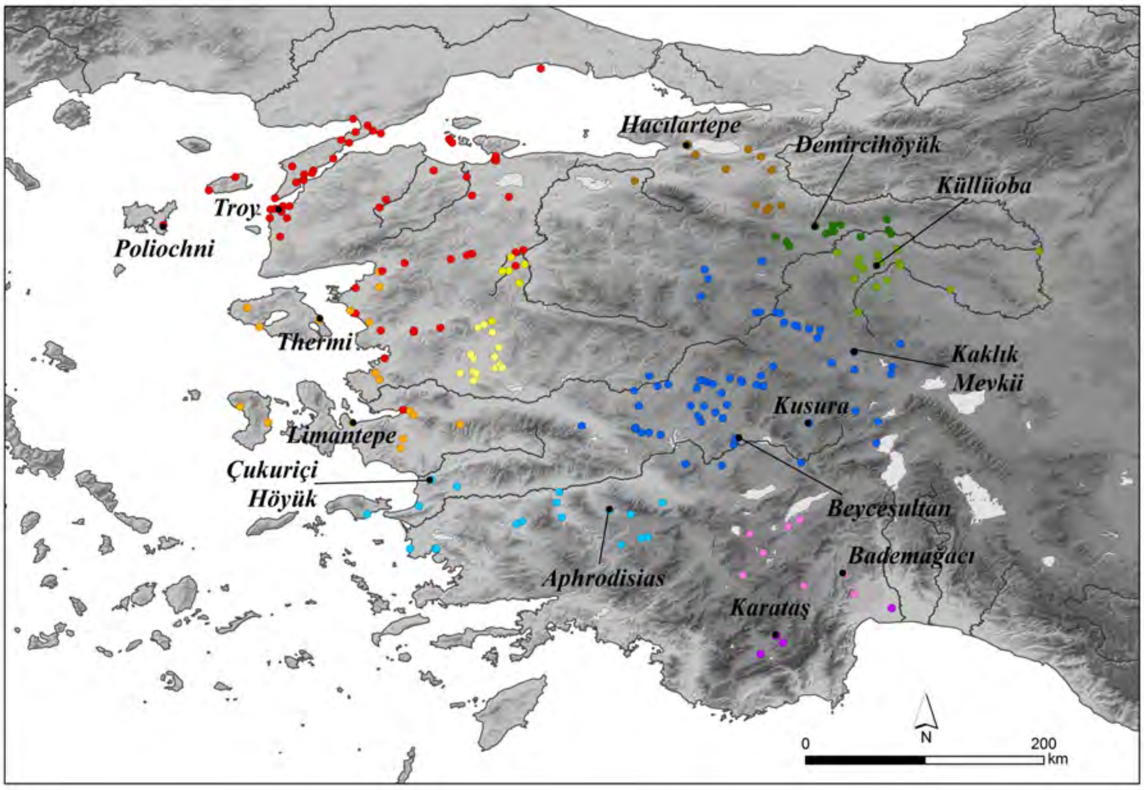

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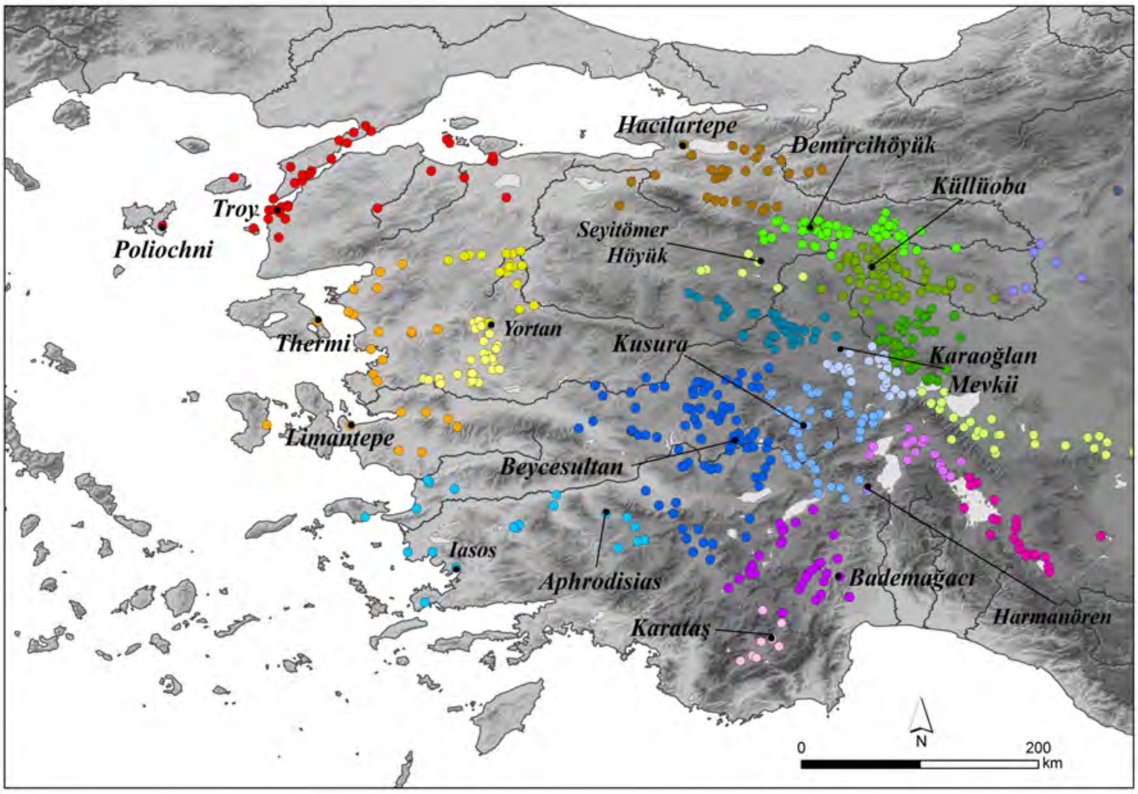

Figure 7.19. Map showing "EB II pottery groups" (c.2800-2400 BC) identified in western Anatolia by Deniz Sarı: each dot represents a single site, and different colours represent affiliation to a particular "pottery group". The names of the major excavated sites with levels belonging to this period are also included. Data courtesy of Deniz Sarı.

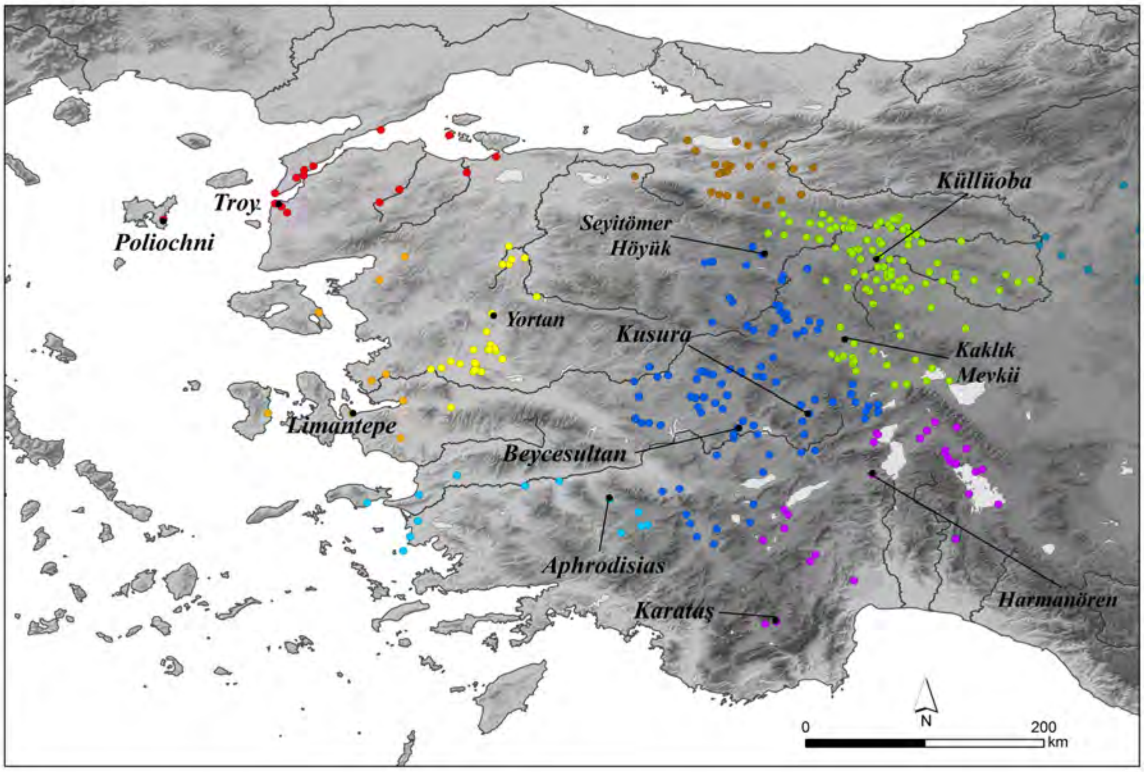

Figure 7.20. Map showing "EB III pottery groups" (c.2400-2000 BC) identified in western Anatolia by Deniz Sarı: each dot represents a single site, and different colours represent affiliation to a particular "pottery group". The names of the major excavated sites with levels belonging to this period are also included. Data courtesy of Deniz Sarı.

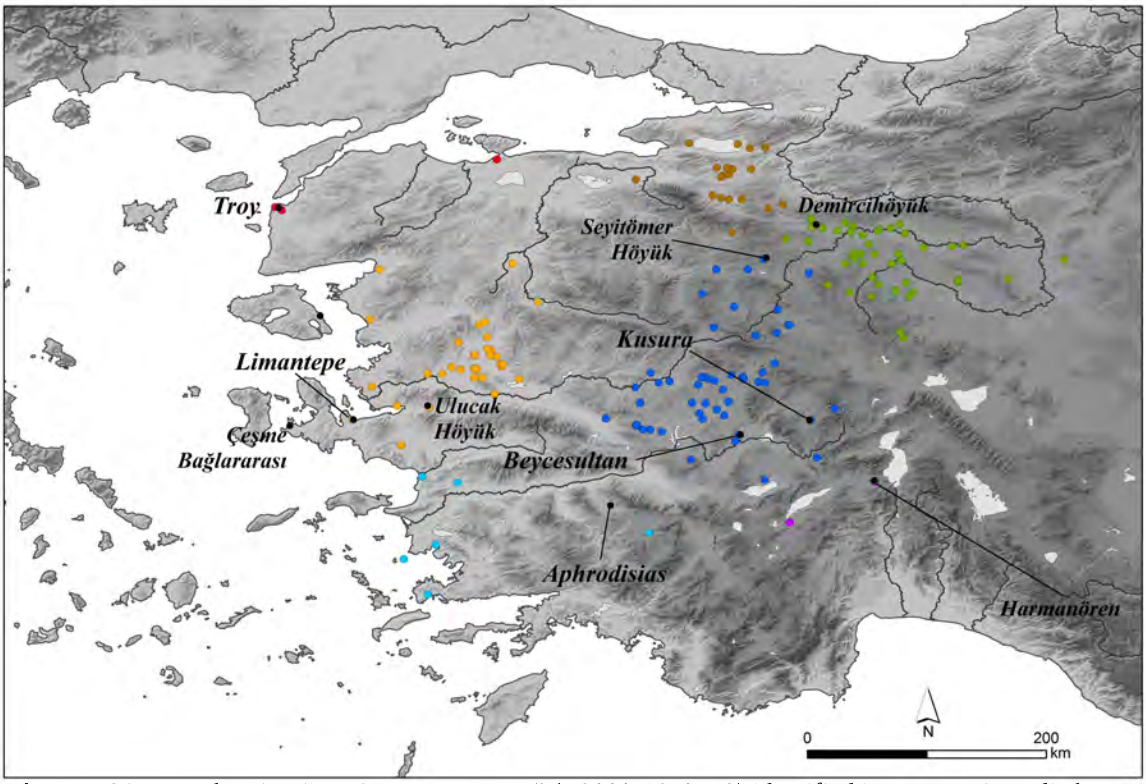

Figure 7.21. Map showing "MBA pottery groups" (c.2000-1650 BC) identified in western Anatolia by Deniz Sarı: each dot represents a single site, and different colours represent affiliation to a particular "pottery group". The names of the major excavated sites with levels belonging to this period are also included. Data courtesy of Deniz Sarı.

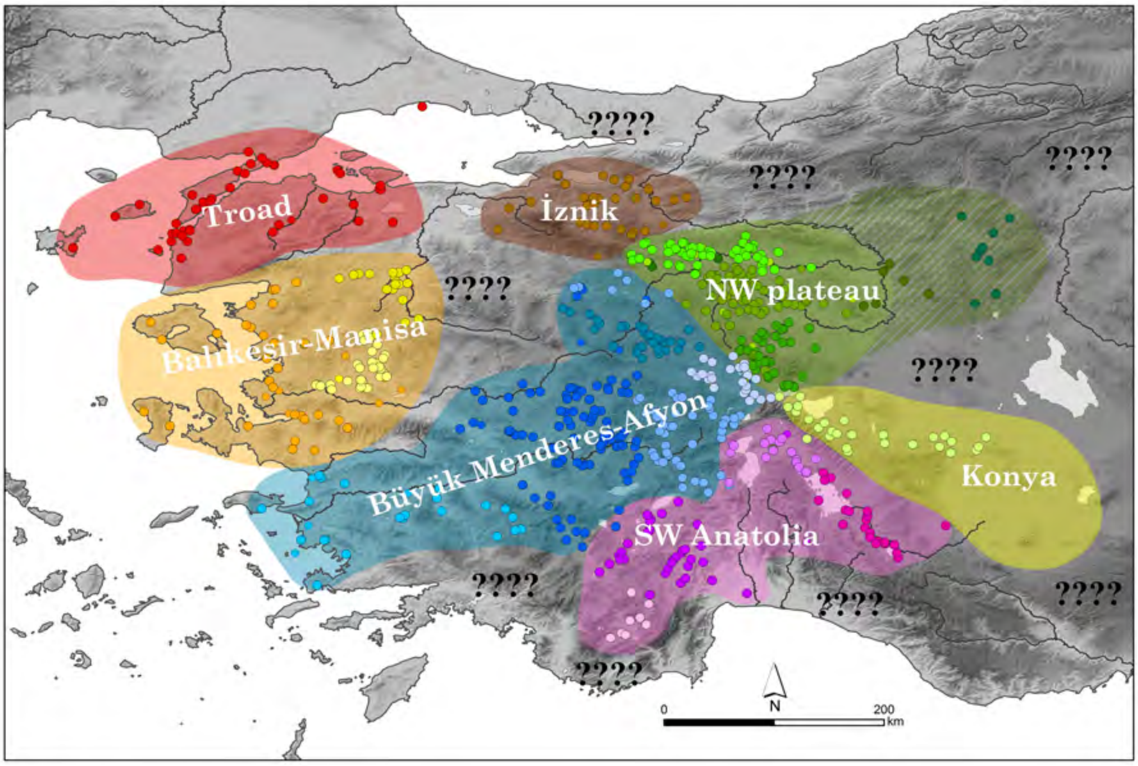

Figure 7.22. Map showing the "cultural regions" in western Anatolia and the western section of the central Anatolian plateau, as identified by Deniz Sarı based on pottery and figurine traditions from the late 4th to the early 2nd millennia BC. Also plotted are all analysed sites belonging to the same period, with colours representing different "pottery groups".

Period	No. stratigraphic pillars	No. sites	No. "pottery groups"	Average "pottery group" area (in km2)
EB I	7	217	10	8090
EB II	11	750	19	4120
EB III	7	406	9	11360
MBA	3	169	7	11580

a)

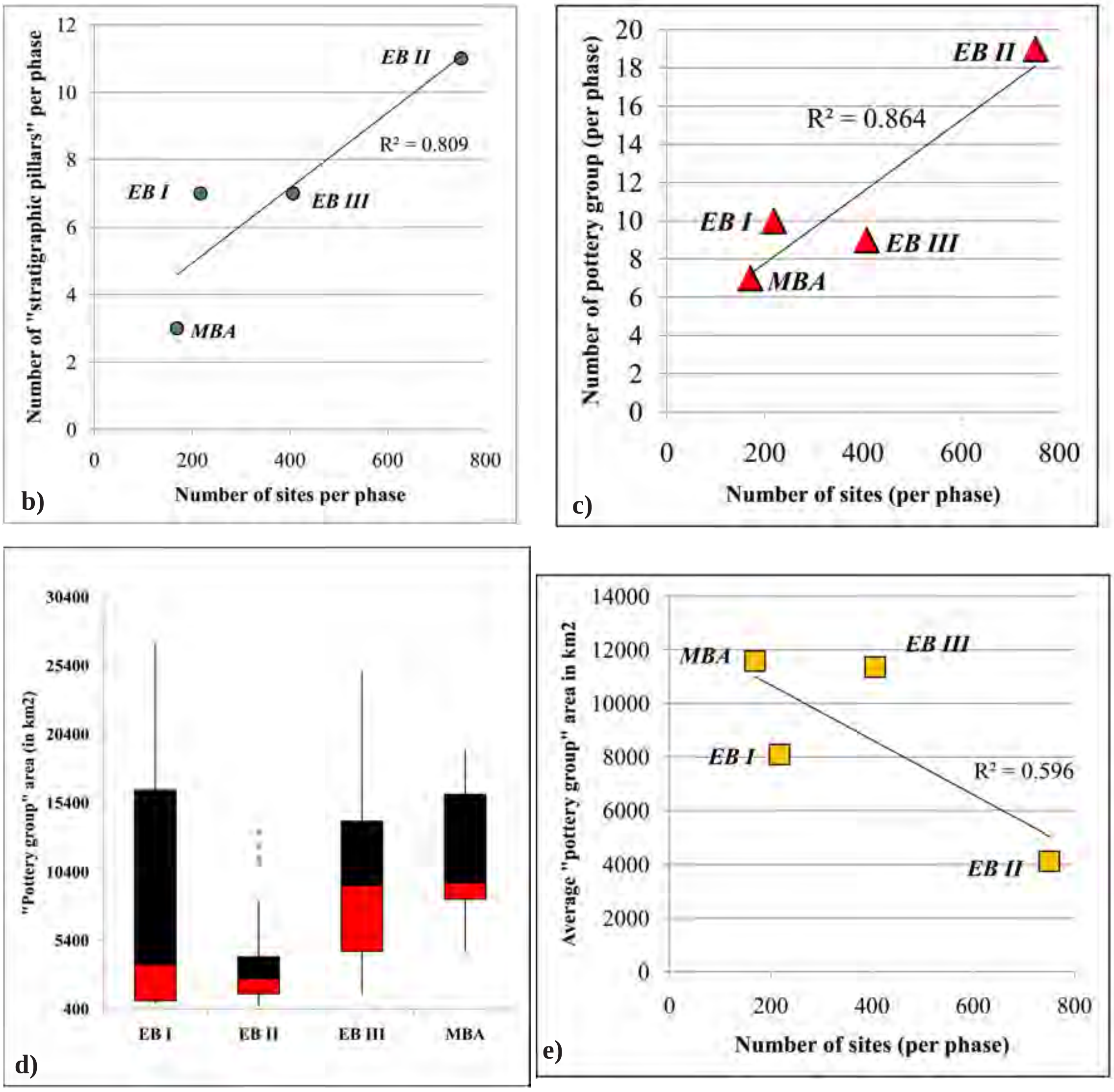

Figure 7.23. Analysis of Sarı's ceramic assemblages dataset: a) summary table indicating, for each of her phases, the number of "stratigraphic pillars" with excavated levels belonging to that phase (cf. section 1.4.1 for the term), the total number of sites analysed, the total number of identifiable "pottery groups", and the average extent (in km2) of the "pottery groups"; b) chart showing the positive correlation between the number of "stratigraphic pillars" and the number of identified sites, in each of the four phases; c) chart showing the positive correlation between the number of "pottery groups" identified in each phase and the number of sites for the same phase; d) box and whiskers plot showing the range of "pottery groups" areas (in km2), for each phase; e) chart showing the negative correlation between the average "pottery group" area (in km2) for each phase, and the number of recognised sites.

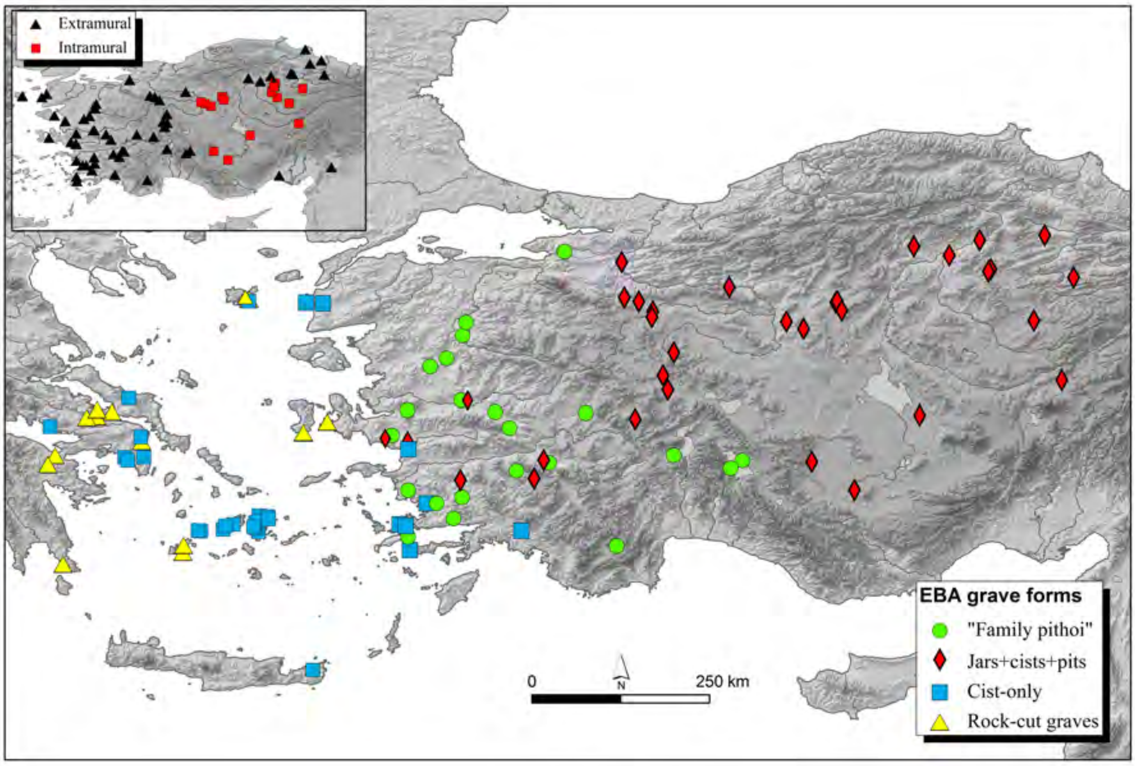

Figure 7.24. Map showing the distribution of main grave types and grave type combinations across western/central Anatolia and the Aegean during the Early Bronze Age. NB: Cretan tholos graves and Aegean corbelled tombs have been omitted since they are not represented in Anatolia. Inset shows the distribution of extramural and intramural cemeteries in EBA western and central Anatolia.

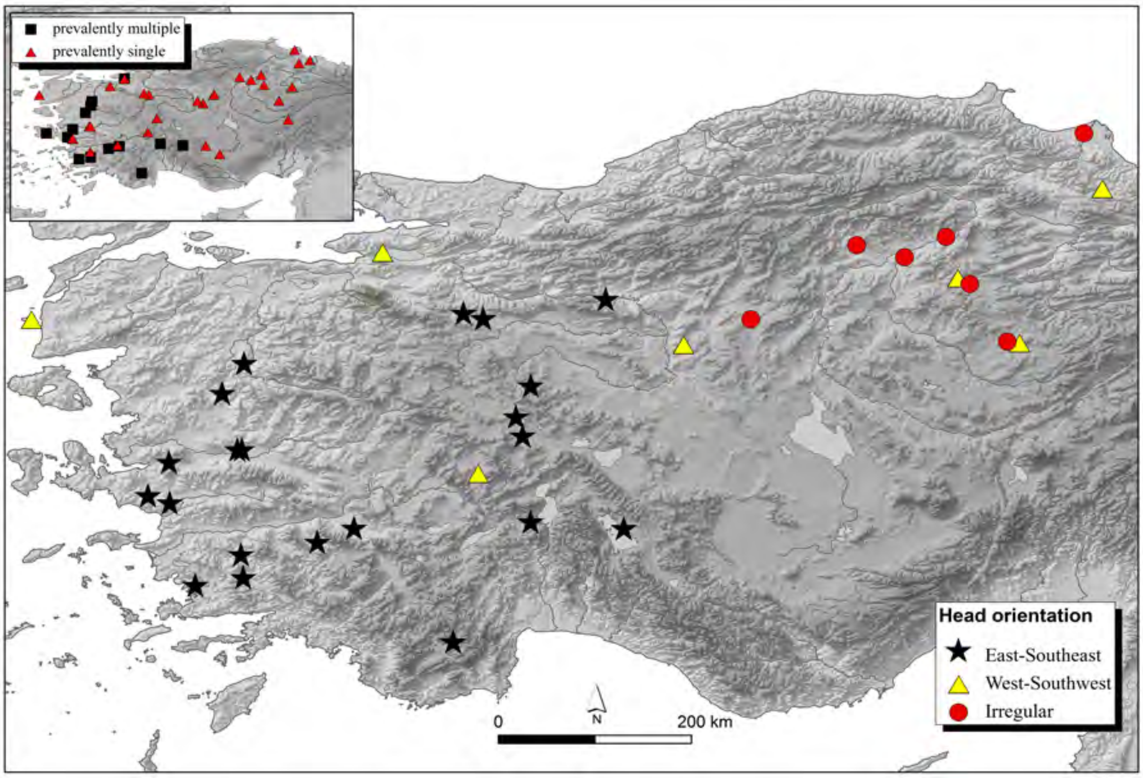

Figure 7.25. Map showing the normative orientation of the interments' head across EBA western and central Anatolian cemeteries. Inset shows the distribution of (prevalently) single vs. (prevalently) multiple burials within a single grave across EBA cemeteries.

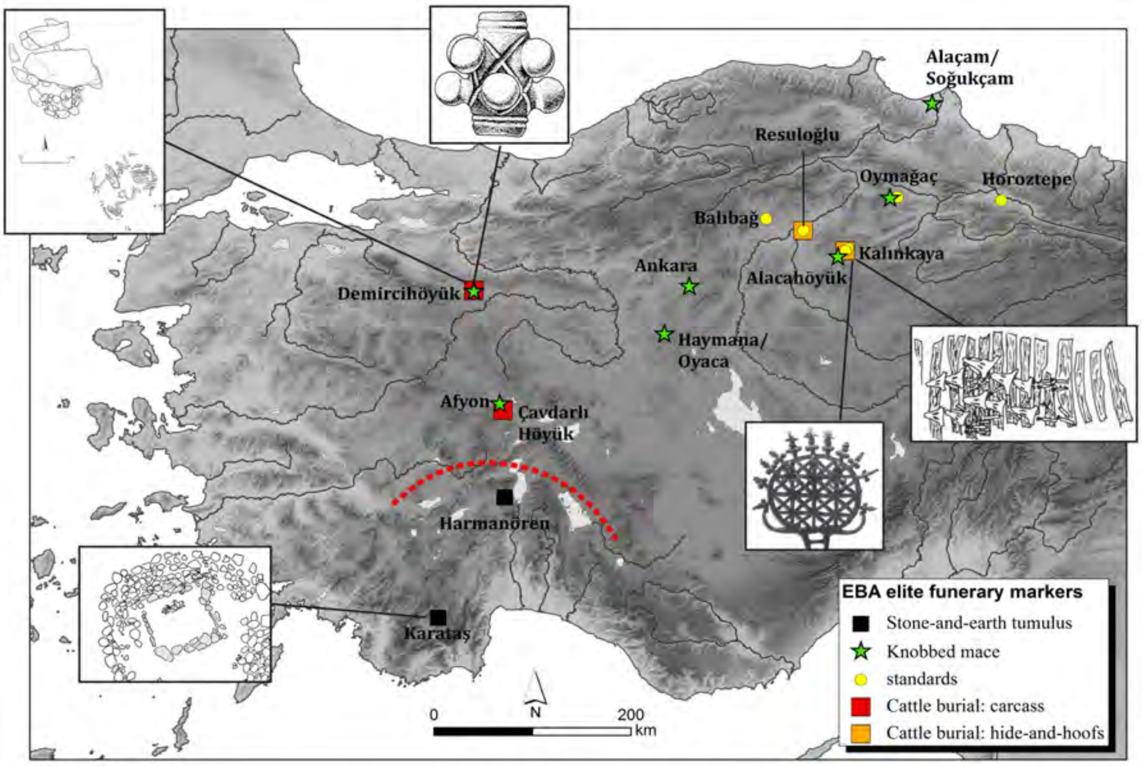

Figure7.26. Map showing the distribution of different elements marking elite funerary contexts in EBA western and central Anatolia.

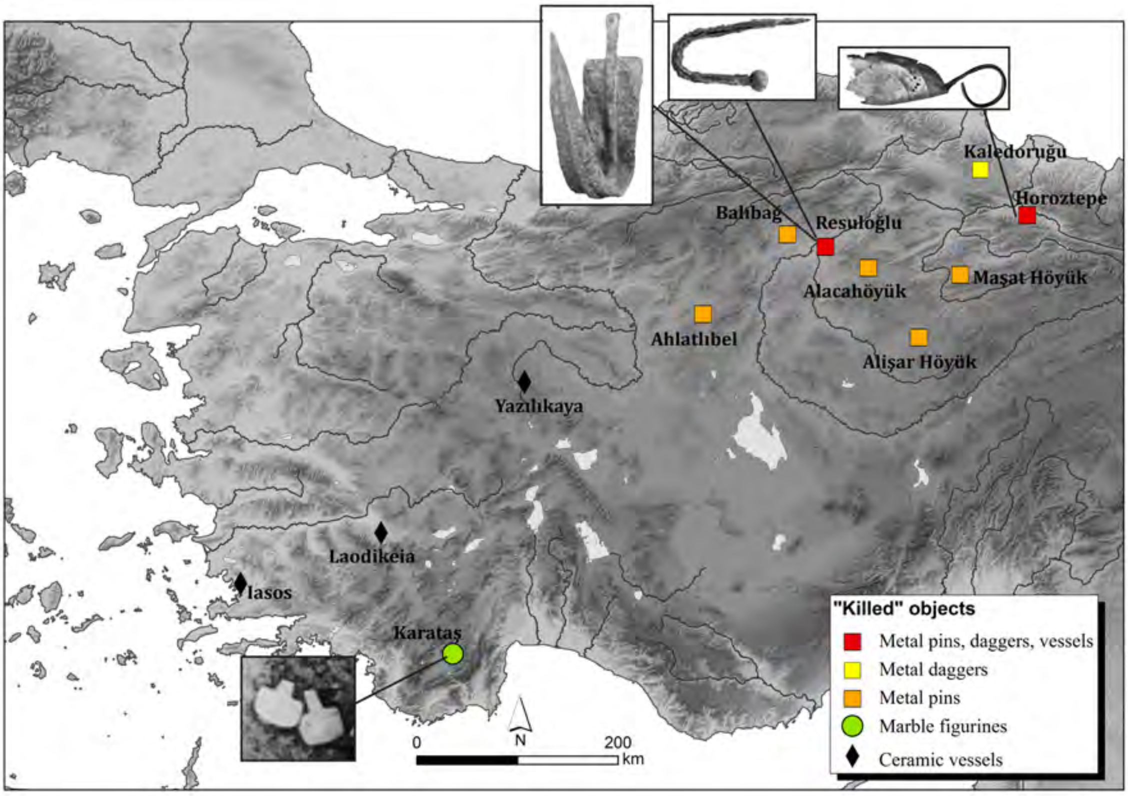

Figure 7.27. Maps showing the distribution of different categories of grave goods that were intentionally fragmented, bent or crushed, across western and central Anatolian EBA cemeteries.

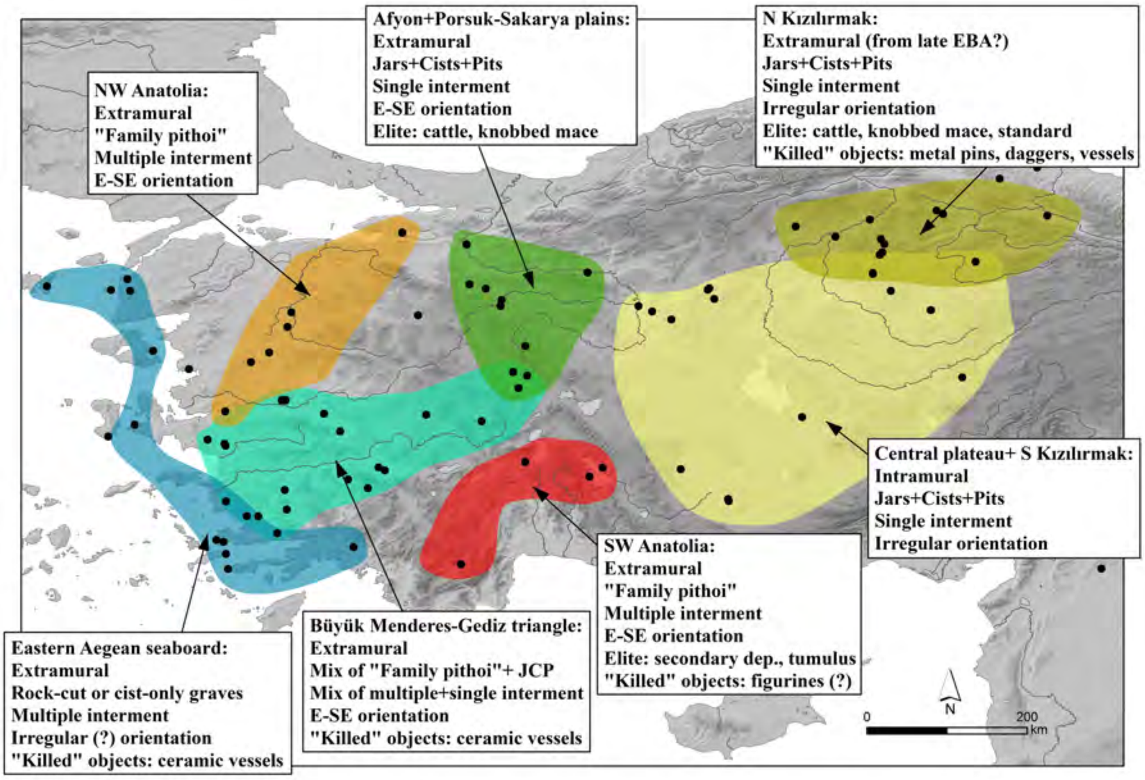

Figure 7.28. Map showing the extent of identifiable regional traditions of EBA funerary practices across western and central Anatolia. Text boxes highlight combinations of funerary traits that define each area.

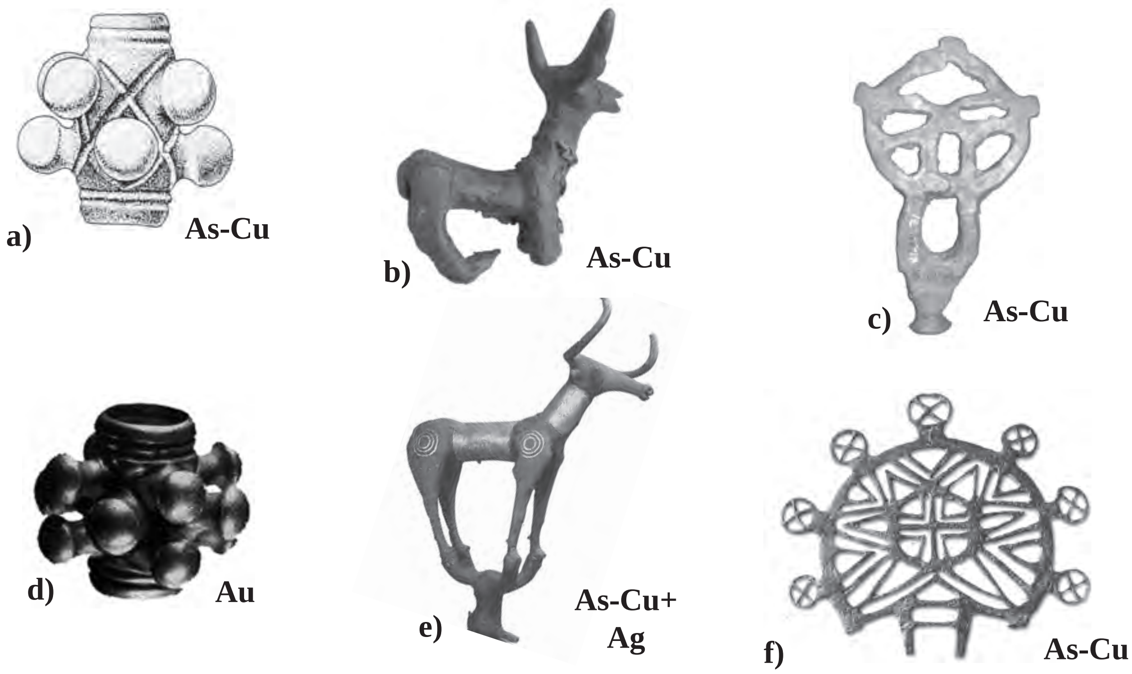

Figure 7.29. Artefacts from Demircihöyük-Sarıket (a) and Kalınkaya (b-c) imitating more sophisticated products such as those found in Alacahöyük (d-f). a) knobbed mace in arsenical copper (Seeher 2000: pl.25.132a), b) theriomorphic standard in arsenical copper (Zimmermann 2007:fig.11.a), c) circular open-work standard in arsenical copper (Zimmermann 2007:fig.11.b), d) knobbed mace in gold (Zimmermann 2008:fig.2.5), e) theriomorphic standard in arsenical copper, with silver inlays and silver plating (Bilgi 2004:69), f) circular open-work standard in arsenical copper (Bilgi 2004:54). Artefacts not to scale.

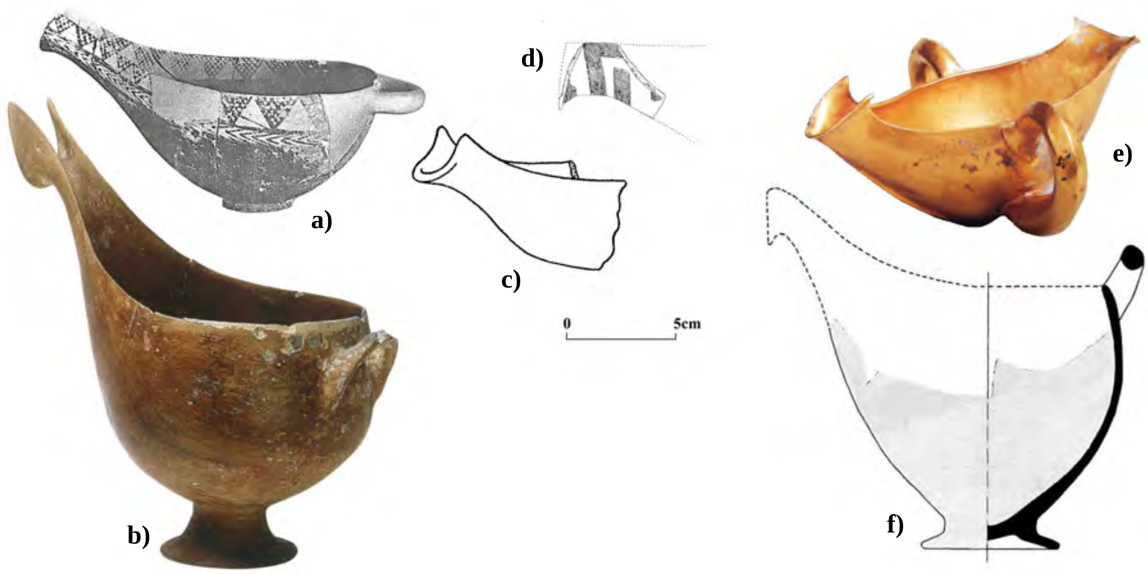

Figure 7.30. Selection of sauceboats from the Cyclades (a), mainland Greece (b) and western Anatolia (c-f), at the same scale. a) Spedhos on Naxos (Broodbank 2000:fig.60a); b) Chalandriani on Syros (Şahoğlu and Sotirakopoulou 2011:cat.no.14), c) Thermi on Lesbos (Lamb 1936:fig.32.521), d) Poliochni (Bernabò Brea 1964:pl.CXXXg), e) Troy (in gold, Antonova et al.1996:cat.no.32), f) Limantepe (Şahoğlu 2004:fig.3d).

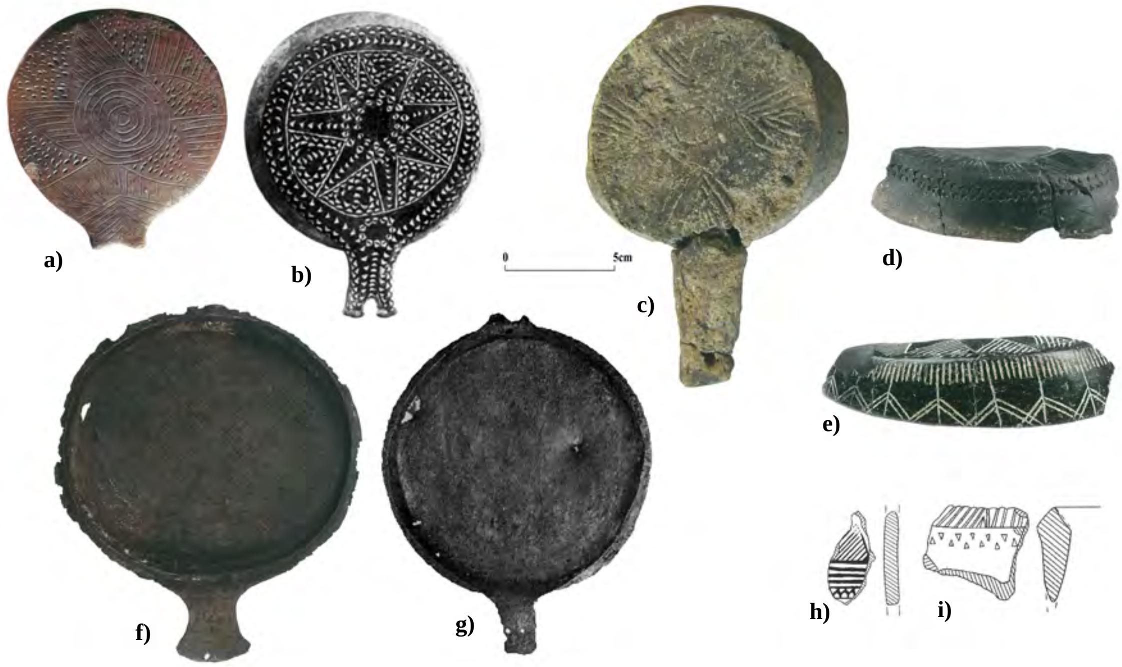

Figure 7.31. Selection of "frying pans" from the Cyclades (a-b) and Anatolia (c-i), at the same scale. a) "Cyclades" (Şahoğlu and Sotirakopoulou 2011:cat.no.7), b) Chalandriani on Syros (Coleman 1985:fig.2), c) Karahisar Höyük (Şahoğlu and Sotirakopoulou 2011:cat.no.95), d) Bakla Tepe (Şahoğlu and Sotirakopoulou 2011:cat.no.91), e) Limantepe (Şahoğlu and Sotirakopoulou 2011:cat.no.92), f) Alacahöyük grave A (Şahoğlu and Sotirakopoulou 2011:cat.no.504), Horoztepe (Özgüç and Akok 1958:pl.VII.1), h-i) Kadıkale (Akdeniz 2011:figs.1-2).

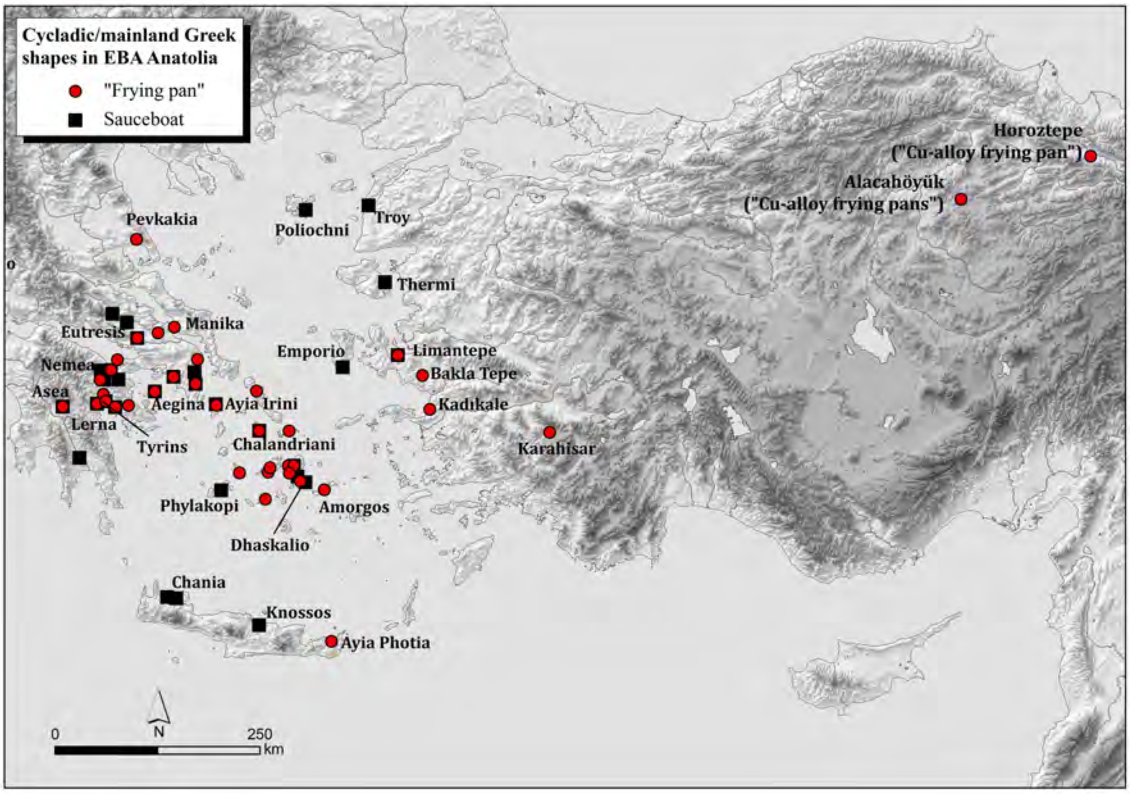

Figure 7.32 Distribution of "frying pans" and sauceboats across the Aegean basin (c.2800-2300/2200 BC). Data for the western Aegean from Broodbank 2000; Coleman 1985; Renfrew 1967. Data for Anatolia from Akdeniz 2011:figs.1-2; Şahoğlu 2011:171-173.

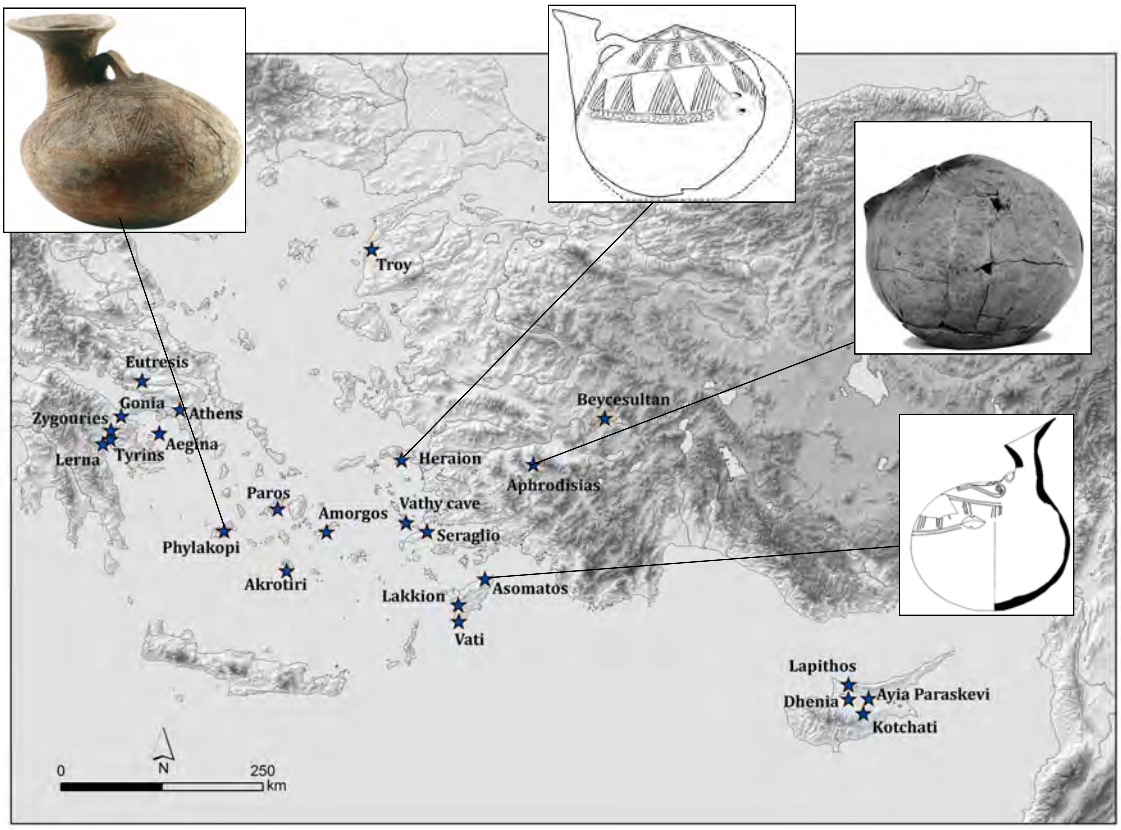

Figure 7.33 Distribution of duck-shaped askoi in the Aegean basin and on Cyprus (c.2200-1800 BC). Data from Benzi 1997; Marketou 2009; Rutter 1982, 1983, 1985.

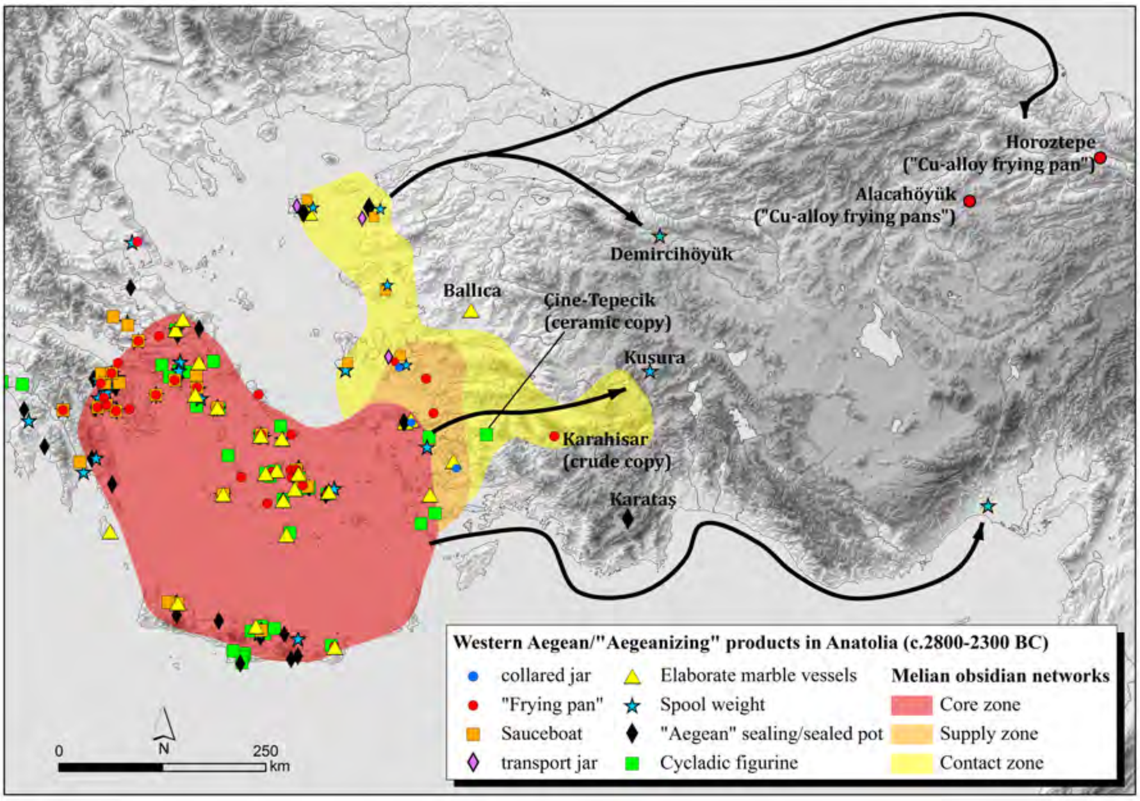

Figure 7.34. Distribution of Cycladic/mainland Greek products in the Aegean basin and Anatolia, c.2800-2300 BC. Arrows show possible routes for the circulation of Aegean products outside the main area of diffusion.

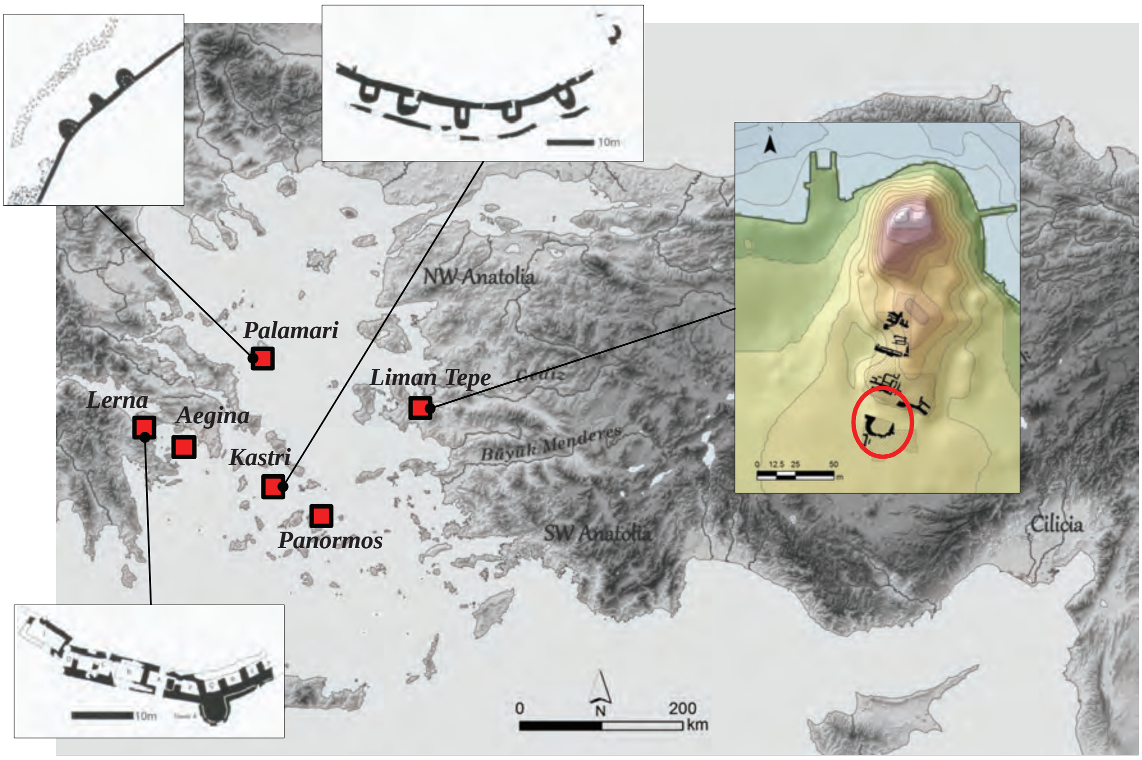

Figure 7.35. Distribution of horseshoe-shaped bastions in the Aegean (c.2500-2000 BC). Data from Kouka 2013:570-571; Şahoğlu 2008:488.

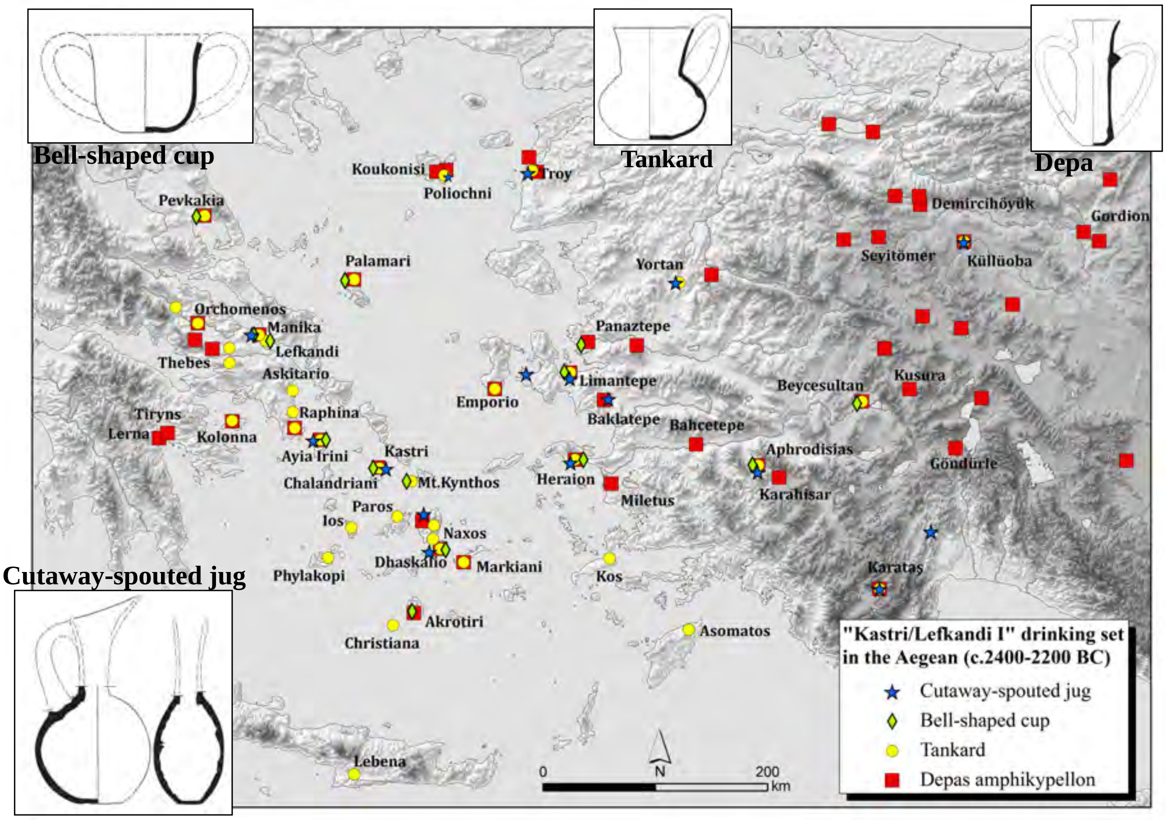

Figure 7.36. Distribution of different elements of the "Kastri/Lekandi I" drinking set in the Aegean basin (c.2400-2100 BC). Data from Broodbank 2000:fig.103; Şahoğlu 2014; Türkteki 2010, with additions.

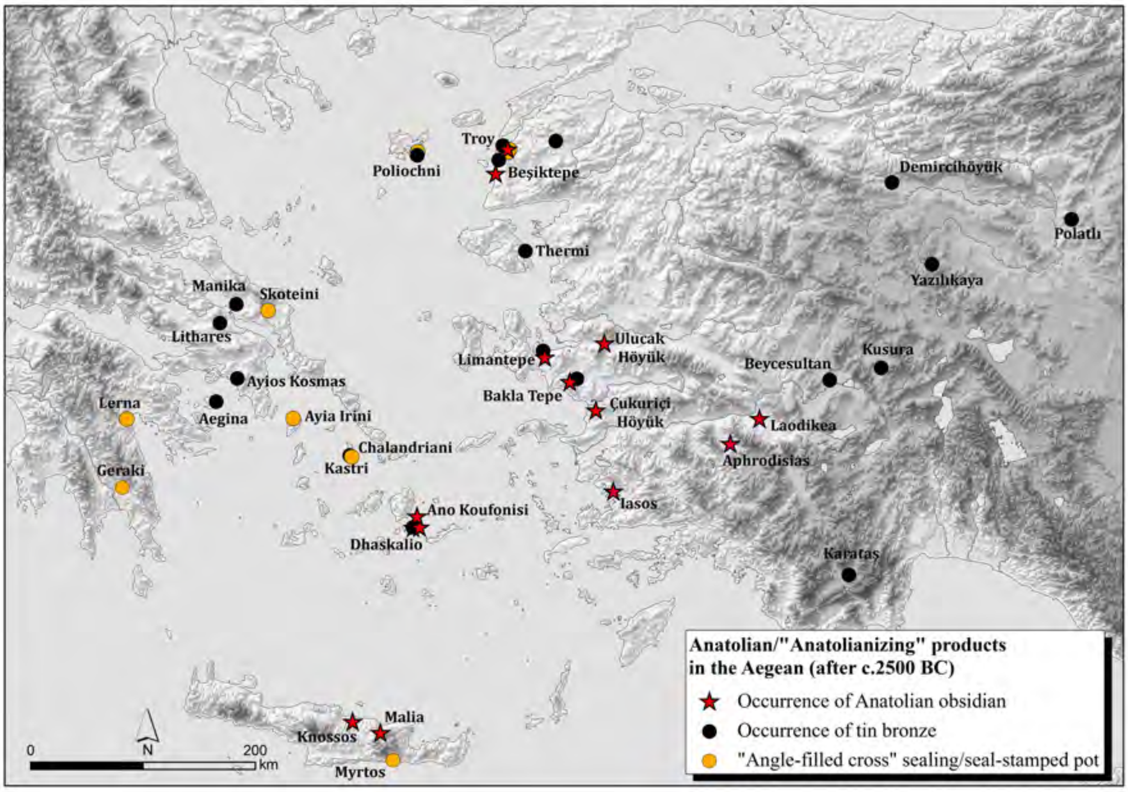

Figure 7.37. Distribution of tin bronzes, central Anatolian obsidian (from Göllü Dağ/Nenezi Dağ), and sealings and seal-stamped pottery with angle-filled cross design in the Aegean basin (c.2500-2000 BC). Data from chapters 5-6, complemented with Carter and Milič 2013:541; Georgakopoulou 2013:686; Kayafa et al.2000:41-42, table 2.2; McGeehan-Liritzis and Gale 1988.

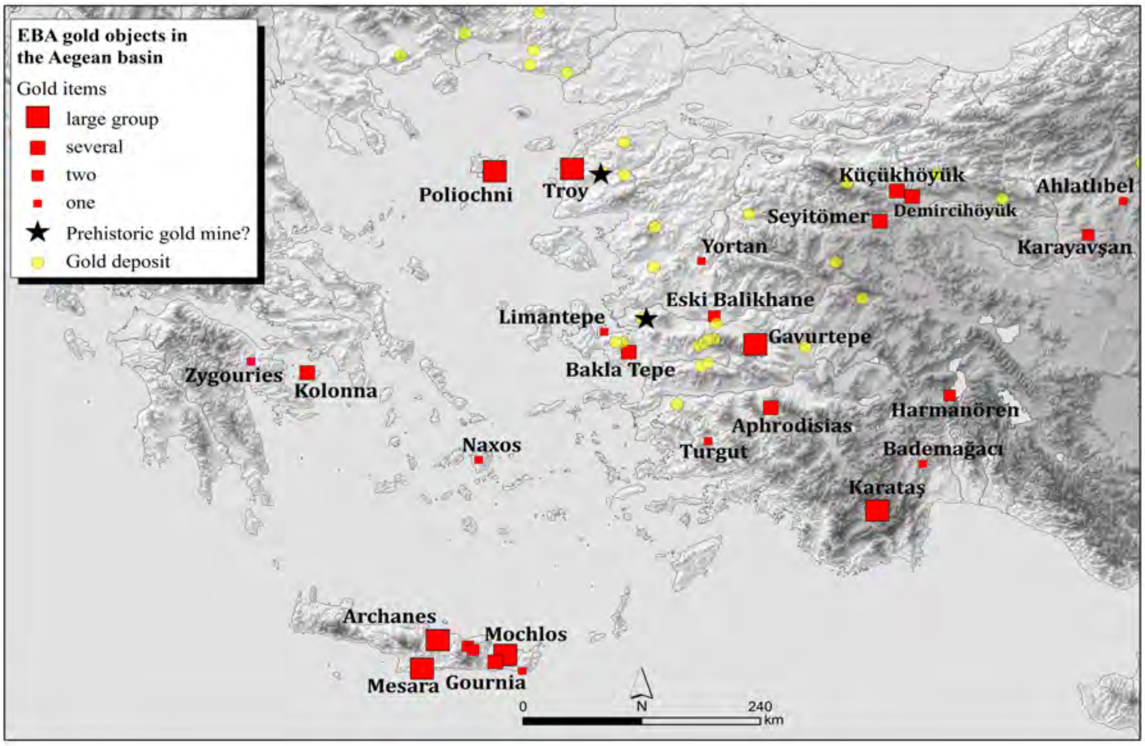

Figure 7.38. Occurrence of gold objects in the Aegean basin (c.2800-2000 BC), and location of known gold deposits in Anatolia and Balkans. Data from chapter 6; Legarra Herrero 2014; tayproject.org.

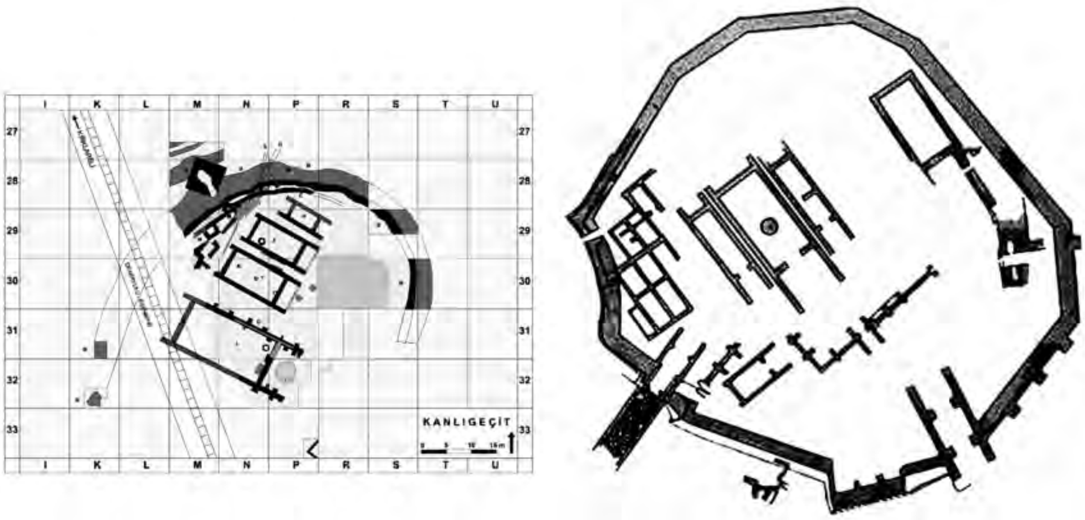

Figure 7.39. Comparison between the plan of monumental areas at Kanlıgeçit KG 2 (a) and Troy IIc (b), at the same scale (Özdoğan 2011:figs.4-5).

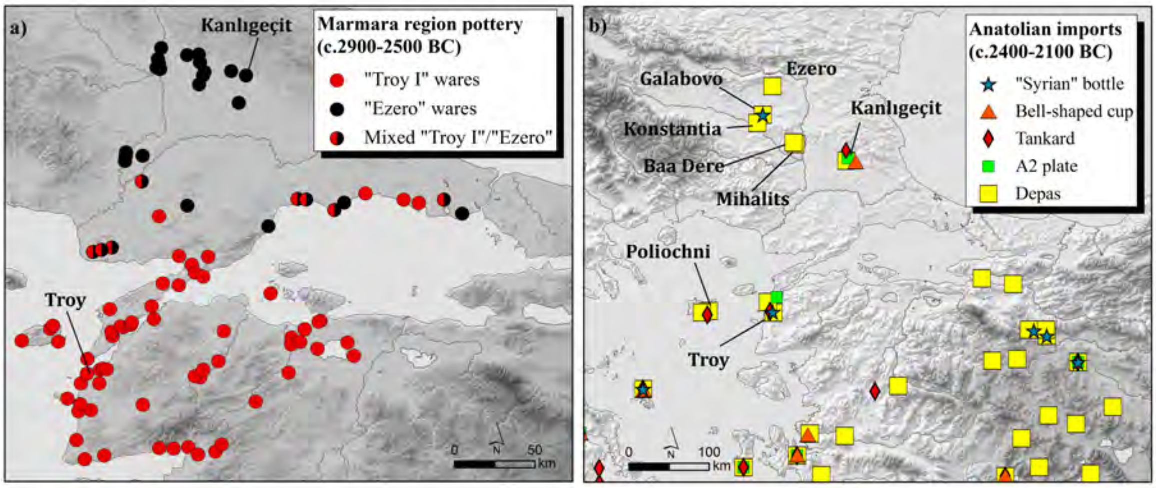

Figure 7.40. a) distribution of "Troy I" (Anatolian) and "Ezero" (Bulgarian) wares around the Marmara basin, c.2900-2500 BC (data from Özdoğan 1999, map 2); b) occurrence of Anatolian/"Anatolianizing" shapes in eastern Thrace and north-western Anatolia, c.2400-2100 BC (data for Thrace from Leshtakov 2002).

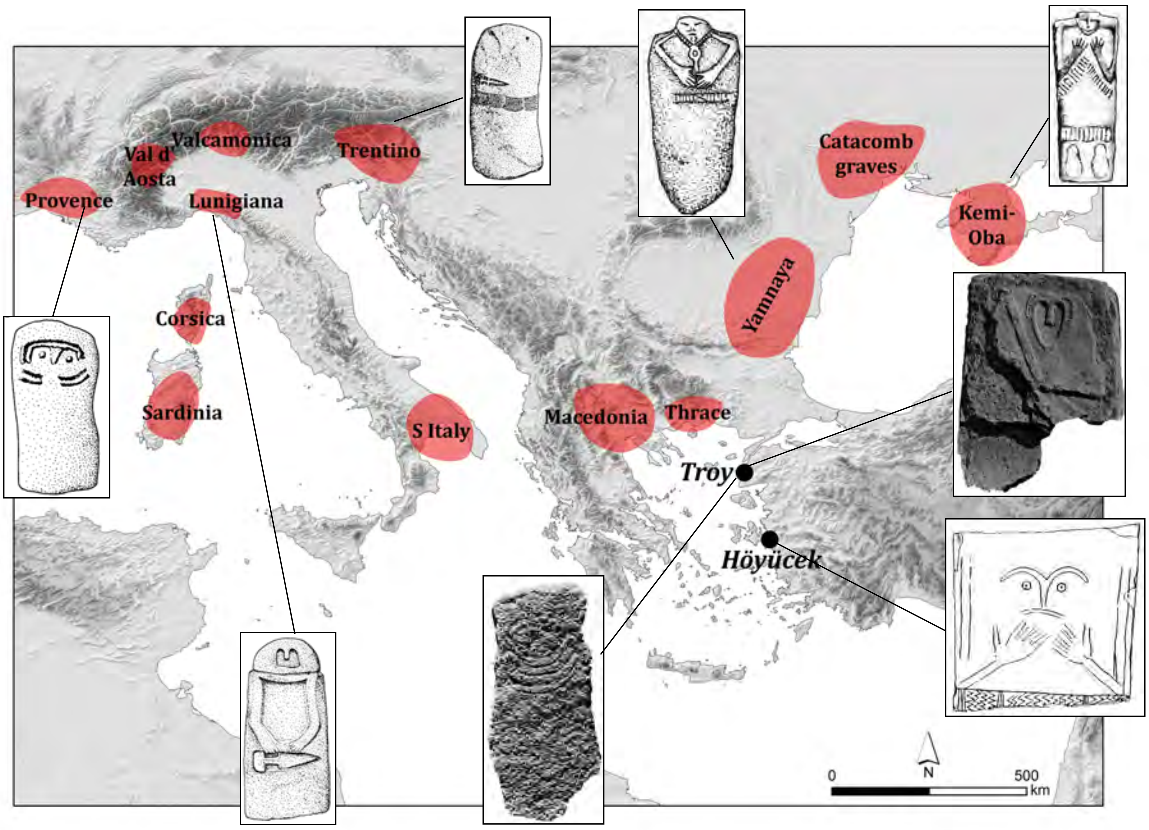

Figure 7.41. Distribution of anthropomorphic stone stelae between the late 4th and early 3rd millennia BC, and a few examples (data and figures from Anthony 2007:336-339, fig.13.11; Blegen et al.1950:figs.93, 189; Doğer 1995:fig.1; Robb 2009:figs.1-4).

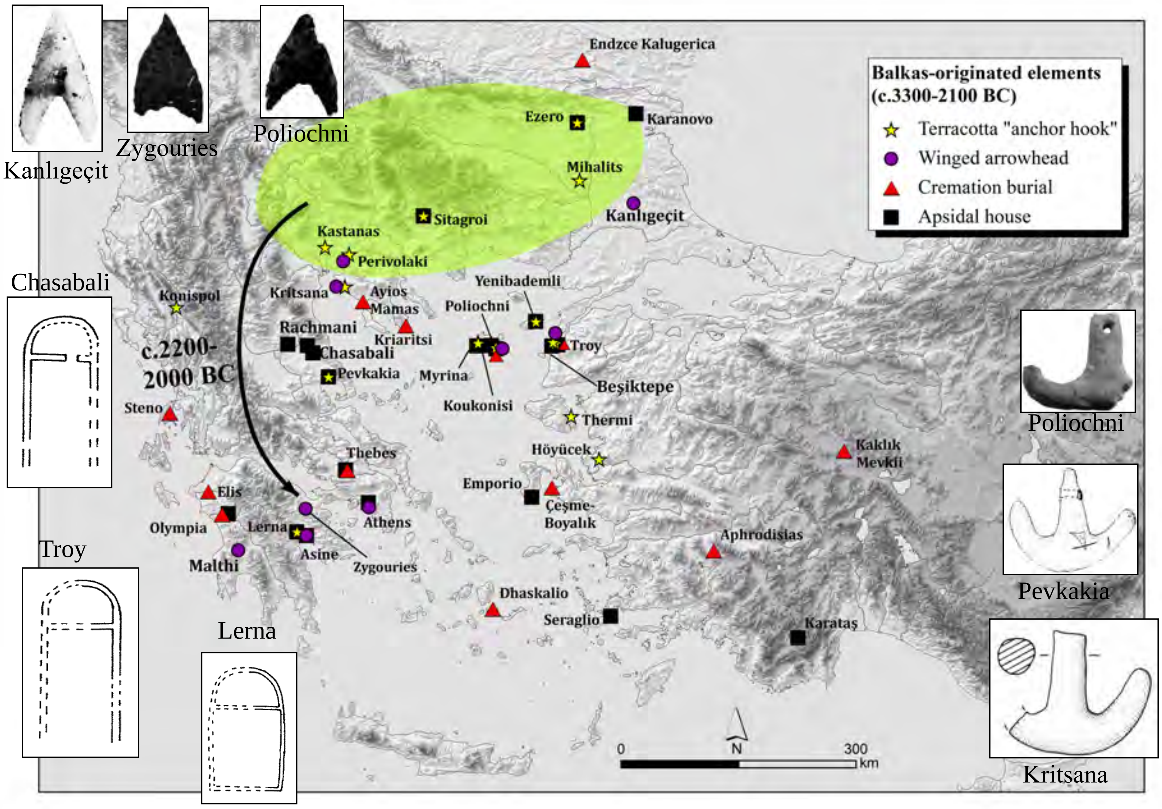

Figure 7.42. Distribution of "anchor hooks", apsidal houses, cremation burials, and winged arrowheads between north-western Anatolia, south-eastern Europe and mainland Greece, c.3300-2100 BC (data from Cavanagh and Mee 1998: Cultraro 1998; Hielte 2004; Hüriyılmaz 2001; Marketou 1997; Warner 1979, with additions). Note that in mainland Greece these elements occur only in the Early Helladic IIb/III period.

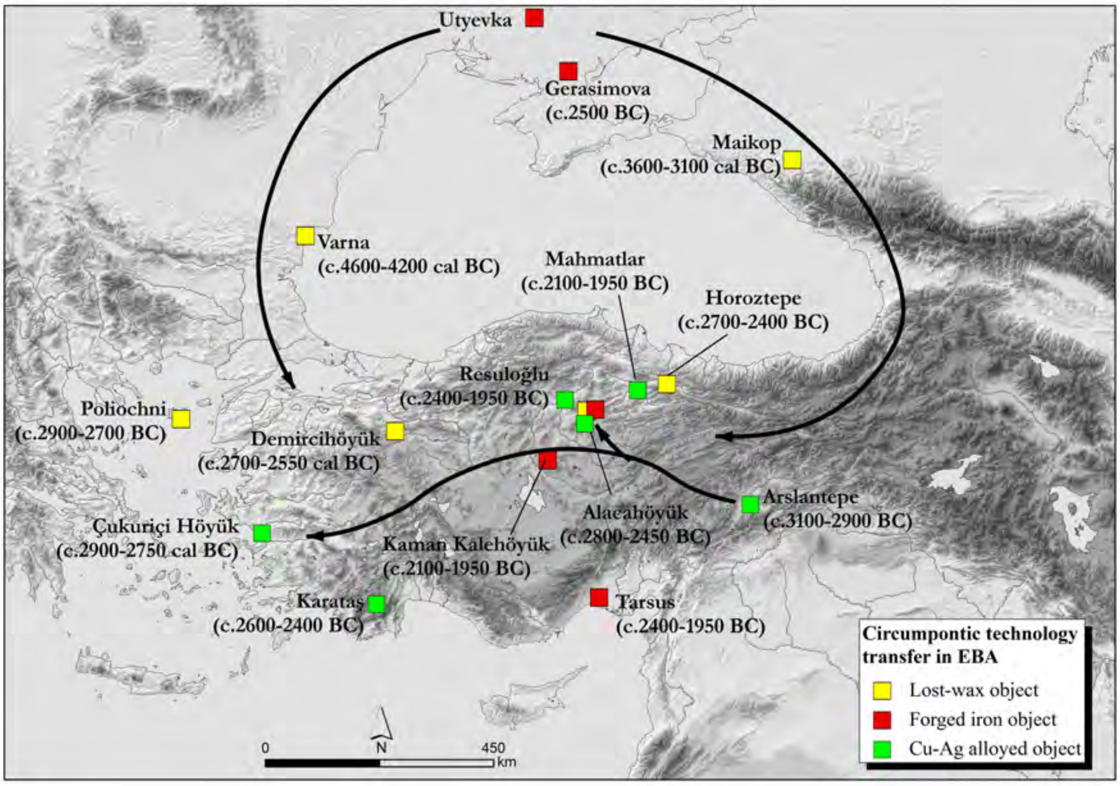

Figure 7.43. Patterns of metallurgical technology transfers around the Black Sea: distribution of objects made with lost wax technique, objects made of copper-silver alloys, and forged iron objects (data from Anthony 2007>336; Yalçın 1999; Zimmermann and Yıldırım 2011, with additions).

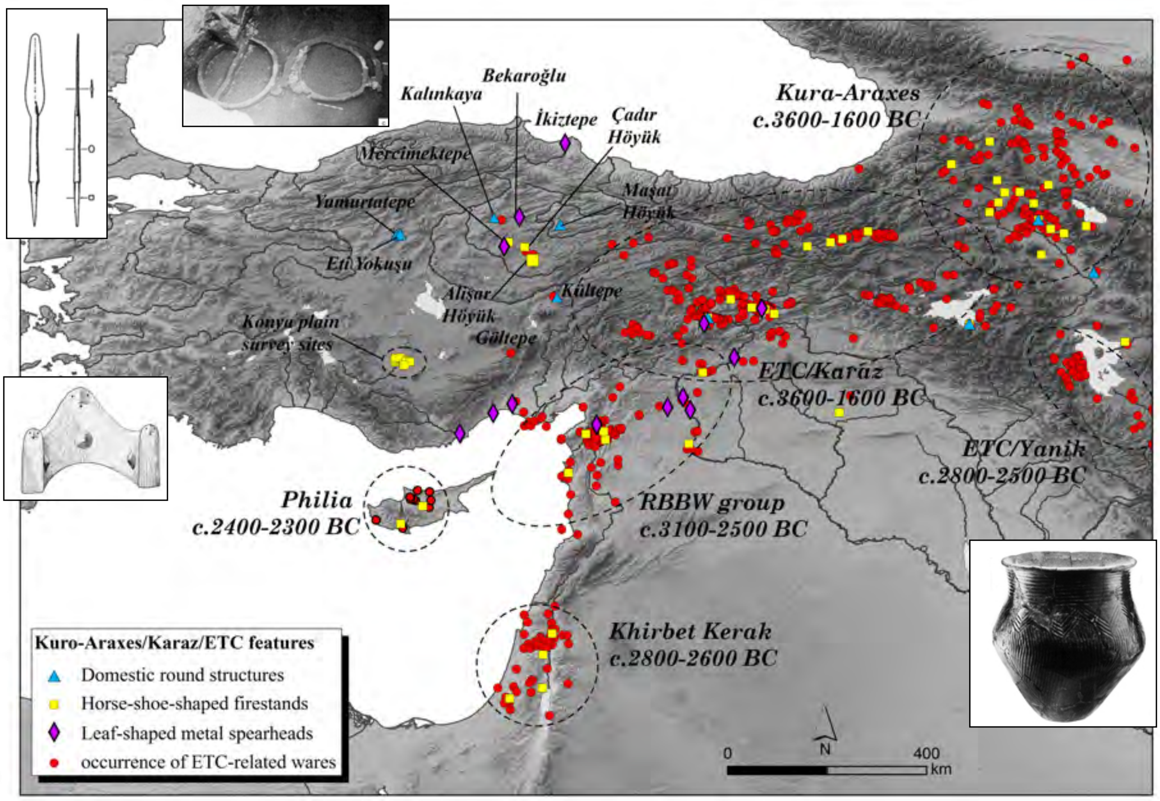

Figure 7.44. Distribution of Early Transcaucasian-related features, including Red & Black Burnished Wares, horseshoe-shaped portable hearths, circular domestic buildings and leaf-shaped metal spearheads. Dates refer to the occurrence and persistence of ETC-features in each region. Data from Palumbi 2009; Rahmstorf 2010c; Zimmermann 2010b, with additions. Pottery data courtesy of Toby C. Wilkinson.

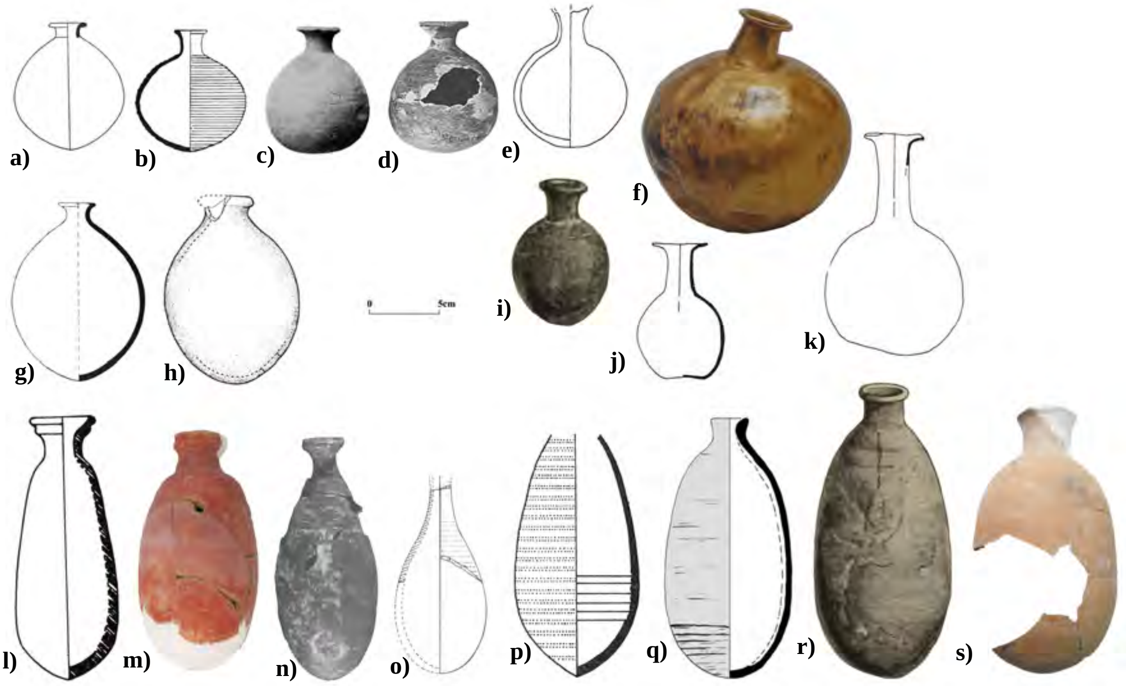

Figure 7.45. Examples of Early Bronze Age "Syrian" bottles from Upper Mesopotamia (a, b, g, l, p) and Anatolia, approximately at the same scale. a) Tell Chuera (Kühne 1976:fig.72), b) Ur (Kühne 1976:fig.C9), c) Alişar Höyük (von der Osten 1937a:fig168.d2762), d) Kültepe (Özgüç 1986:fig.3.11), e) Galabovo (Leshtakov 2002:fig.11.1), f) Troy (Antonova et al.1996:cat.no.4), g) Mari (Kühne 1976:fig.C10), h) Küllüoba (Türkteki 2010:pl.23.1), i) Troy (Schliemann 1881:fig.407), j) Küçükhöyük (Baykal-Seeher 1998: fig.1.5), k) Demircihöyük-Sarıket (Baykal-Seeher 1998:fig.1.3), l) Tell Amarna (Kühne 1976:fig.C2), m) Küllüoba (Türkteki 2010:pl.22.1), n) Eskiyapar (Özgüç and Temizer 1993:pl.116.1), o) Acemhöyük (Öztan 1989:fig.39), p) Tell Chuera (Kühne 1976:fig.65), q) Kinet Höyük (Zimmermann 2005:fig.1.1) r) Troy (Schliemann 1881:fig.408), s) Küllüoba (Türkteki 2010:pl.22.2).

Map No	Site	Tot	Absolute date	Stratigraphy	Context	Material	Type	Imported (Syria)	Imported (Anatolia)	Local	Metal	Comments	References
1	Kinet Höyük	1	c.2200-1950 BC	"latest EBA"		clay	alabastron	x					Zimmermann 2005:161-162
2	Tarsus	6	c.2400-2200 BC	"EB IIIa" levels	domestic	clay	alabastron	x		x		made in Metallic Ware (3) and local ware (3)	Goldman 1956:154, pl.268
2	Tarsus	1	c.2600-2400 BC	"EB II" levels	domestic	lead	alabastron				x	dubious specimen: small fragment, the date does not fit with alabastron chronology.	Goldman 1956:303, pl.435.11
3	Kestel	1	c.2300-2100 BC	in grave inside mine tunnel	funerary	clay	alabastron	x				made in Metallic Ware	Yener 2000:95-96
4	Hazarşah	1		from survey		clay	unknown	x				wheelmade bottle fragment in greyish ware (Grey Jazirah?)	Brown 1967:150-151, 158, fig.16
5	Kültepe	4	c.2500-2400 BC	levels 15-14	funerary/ domestic	clay	globular	x		x		made in Metallic Ware (3) and local ware (1)	Özgüç 1986:37-38
5	Kültepe	8	c.2400-2100 BC	levels 13-11, "Palace"	elite	clay	alabastron	x		x		made in Metallic Ware (7) and local ware (1)	Özgüç 1986:34-36
6	Alişar Höyük	2	c.2300-2200 BC	level 14T, grave x46 and level 7M, "citadel"	funerary/ elite	clay	globular		x			1 wheelmade, with red slip (Anatolian), but not local because there is no local wheelmade production until level 5M, the other handmade (local?) with lugs ("breasts") of typical Anatolian production	Schmidt 1932:43, fig.45; von der Osten 1937a:171, fig.168.d2762
7	Eskiyapar	1	c.2200-1950 BC	"latest EBA"	hoard	silver	alabastron				x	in a cache with hundred gold ans silver objects	Özgüç and Temizer 1993:617, pl.116.1
8	Alacahöyük	1	c.2200-1950 BC	levels 5 or 4		clay	unknown					without context provided	Çınaroğlu et al.2014:8
9	Acemhöyük	1	c.2400-2200 BC	level IX	elite	clay	alabastron	x				wheelmade, greyish clay which seems non-local (Grey Jazirah?)	Öztan 1989:409, fig.39
10	Karahöyük	1				clay	unknown	?				without context	Schachner and Schachner 1995:91
11	Polatlı	1		grave?	funerary?	Cu-alloy	globular					without context	Toker and Öztürk 1992:185, fig.10
12	Küllüoba	10	c.2300-2200 BC	levels IIIB-IIIA, votive pits	votive	clay	alabastron	x	x			made in Metallic Ware (6) and Anatolian (non-local) wares (4)	Türkteki 2010:170-171; Türkteki 2012:68
12	Küllüoba	1	c.2300-2200 BC	level IIIA, votive pit	votive	clay	globular	?					Türkteki 2010:172; Türkteki 2012:68
13	Demircihöyük	32	2700-2550 BC	cemetery	funerary	lead	globular				x	no evidence of on-site metal workshop	Baykal-Seeher and Seeher 1998; Seeher 2000:50-52
14	Küçükhöyük	3	c.2700-2500 BC	cemetery	funerary	lead	globular				x		Baykal-Seeher and Seeher 1998
15	Troy	5	c.2200-1950 BC	level IIg/IIIa/IV	elite	clay	alabastron	?	x	x		in Red-coated Ware (local), Black Polished Ware (Anatolian) and "Plain Ware" (the latter possibly imported?)	Blegen et al.1951:27, 42, 50, 58, fig.70-34.750; Schliemann 1881:441, 442, 605, fig. 408, 1124; Schmidt 1902:78, fig.1824.
15	Troy	4	c.2300-1950 BC	level IIg/IV	elite	clay	globular			x		in Red-Coated Ware (local)	Schliemann 1881:441, 442, 605, figs. 407, 410, 1122, 1129
15	Troy	1	c.2300-2200 BC	level IIg (treasure A)	hoard	gold	globular				x		Schliemann 1881:520-521, fig. 775
16	Galabovo	1	c.2200-1950 BC	level 3	domestic?	clay	globular		x			wheelmade, central Anatolian ware. In the same context with other Anatolian imported vessels	Leshtakov 2002:187, fig.11.1
17	Palamari	1	c.2200-2100 BC	level III	domestic	clay	alabastron		x			wheelmade, Anatolian ware	Rahmstorf 2006b:85

Figure 7.46. Summary table of “Syrian” bottle finds in west/central Anatolia, northern Aegean and eastern Thrace during the Early Bronze Age.

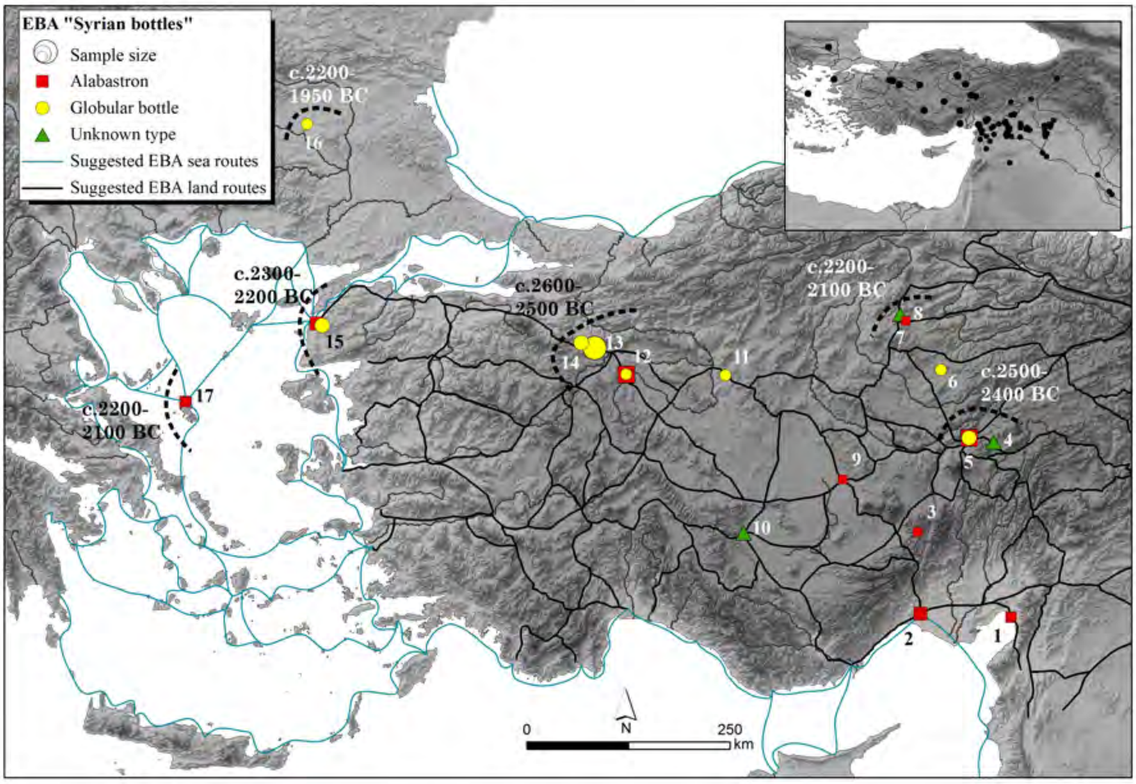

Figure 7.47. Distribution of different types of "Syrian" bottles in west and central Anatolia during the Early Bronze Age, with approximate dates for their earliest appearance in the area and overlaid to the rotes reconstructed in chapter 3. Site numbers refer to table in figure 7.46. Inset shows the distribution of "Syrian" bottles in the wider Near East (data from Rahmstorf 2006b:fig.5).

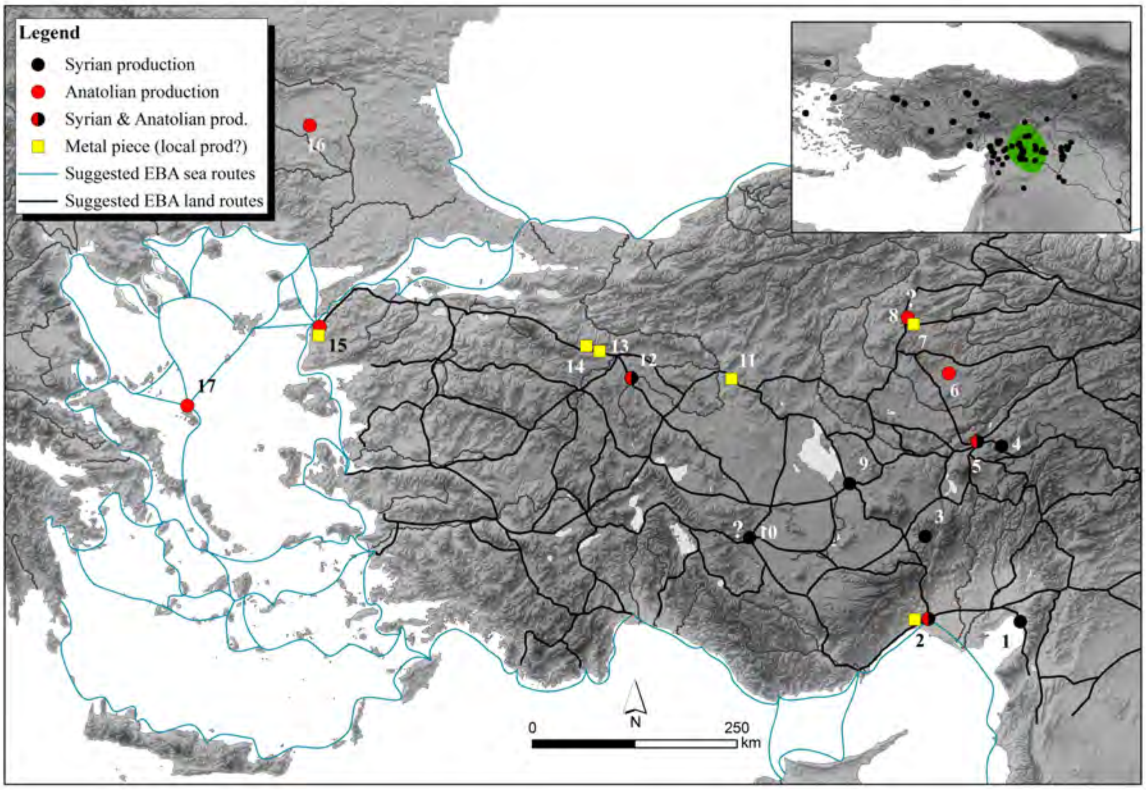

Figure 7.48. Assessment of the possible origin of "Syrian" bottles in west and central Anatolia, based on ceramic wares' analysis (cf. text). Site numbers refer to table in figure 7.46. Inset shows the earliest occurrence of the "Syrian" bottle prototype (marked in green).

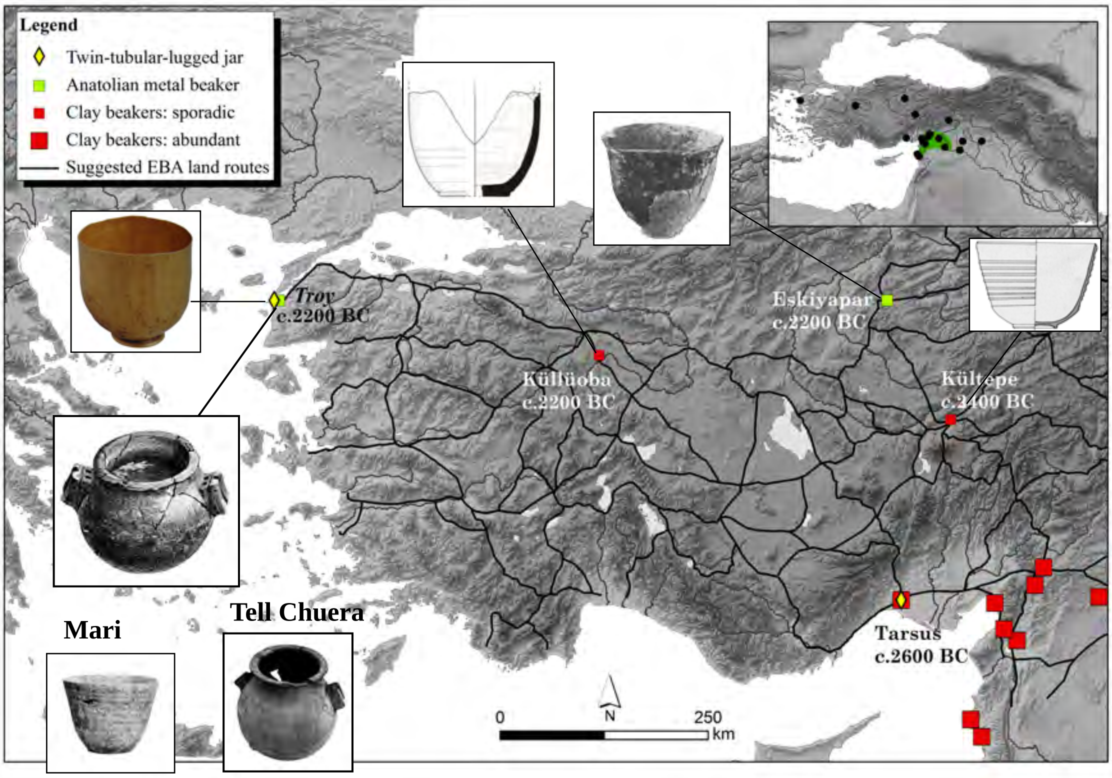

Figure 7.49. Distribution of Early Bronze Age beakers and tubular-lugged small jars in west and central Anatolia. Inset shows the distribution of the beakers in Upper Mesopotamia, with proposed origin of the shape (marked in green).

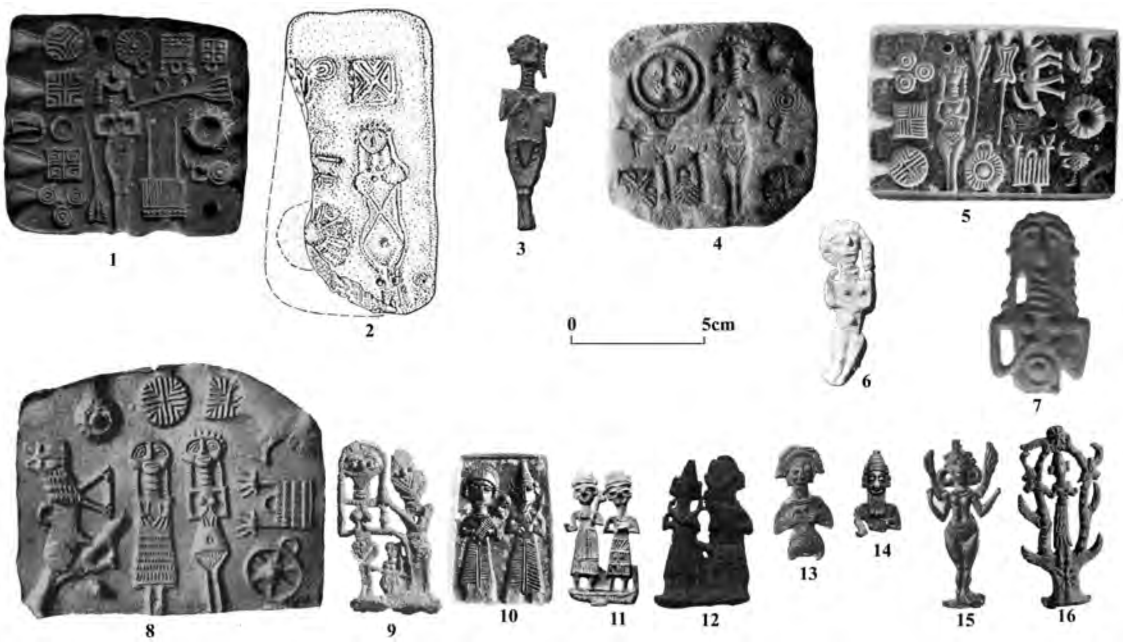

Figure 7.50. Examples of Early (nos.1-9) and Middle Bronze Age (nos.10-16) lead anthropomorphic figurines and moulds for their production in west/central Anatolia and Mesopotamia, at the same scale. 1) Akhisar (Canby 1965:pl.Xa), 2) Küllüoba (Efe 2006b:fig.2), 3) Troy (Schliemann 1881:fig.226), 4) Titriş Höyük (Bilgi 2004:pl.41b), 5) Abu Habba (Canby 1965:pl.Ixd), 6) Tell Brak (Oates et al.2001:fig.163), 7) Tell Mozan (Canby 2003:fig.1), 8) İzmir (Canby 1965:pl.IXa-c), 9) Acemhöyük (Bilgi 2012:fig.966), 10) Alişas Höyük (von der Osten 1937b:fig.230.d154), 11) Alişas Höyük (von der Osten 1937b:fig.230.e916), 12) Seyitömer Höyük (Bilgen 2015:fig.9), 13) Kültepe (Bilgi 2012:fig.1018), 14) Kültepe (Bilgi 2012: fig.1056), 15) Konya-Karahöyük (Bilgi 2012:fig.1047), 16) Kültepe (Bilgi 2012:fig.1022).

Site	Total	Type	Stratigraphy	Absolute date	Context	Depiction	Comments	References
Tell Jassa el-Gharbi	1	figurine	"Akkadian levels"	c.2400-2200 BC	?	adult woman, naked, with braids, necklace and belt, squeezing breasts		Tonussi 2007:148, 154, cat.no.FF/P3
Titriş Höyük	1	mould	"Kurban IVA levels"	c.2400-2300 BC	domestic	adult woman, naked, with braids, necklace, squeezing breasts	dated by the excavators to c.2300-2150 BC, but re-dated by Marchetti to c.2400-2300 BC on the basis of ceramic typology of the associated materials	Laneri 2002:22-29, fig.11; Marchetti 2003:note 6
Troy	1	figurine	"Third Burnt City" (IIg)	c.2300-2200 BC	"citadel"	adult woman, naked, with braids and hairrings, necklace, squeezing breasts		Schliemann 1881:380, fig.226
Urkesh (Tell Mozan)	1	figurine		c.2300-2200 BC	?	adult woman, naked, with braids and hairrings, necklace, squeezing breasts		Canby 2003; Tonussi 2007: 154, cat.no.FF/P5
Nagar (Tell Brak)	1	figurine	stratigraphy uncertain	c.2300-2200 BC	?	adult woman, naked, with braids and necklace, squeezing right breast	originally published as "Ur III/Isin-Larsa", re-dated by the excavators to late Akkadian (cf. Tonussi 2007; also Marchetti 2003, note 5)	Marchetti 2003:note 5; Tonussi 2007:148, cat.no. FF/P2
Thyateira (Akhisar)	1	mould		late EBA	black market	adult woman, naked, with braids, necklace and belt, hands on the abdomen	probably late EBA on stylistic grounds	Canby 1965:58, pl.Xa
Abu Habba (Sippar)	1	mould		latest EBA	?	adult woman, naked, with braids and necklace, squeezing right breast	probably late EBA on stylistic grounds	Canby 1965:55, pl.Ixd
Seyitömer Höyük	1	mould		latest EBA	?	adult woman, naked, with braids and hairrings, necklace, squeezing breasts	probably late EBA on stylistic grounds	Bilgen 2015:219, fig.2035
Küllüoba	1	mould	level IIC	c.2100-1950 BC	workshop?	adult woman, naked, with braids, necklace and waistcoat (?), squeezing breasts		Efe 2006b
Küllüoba	1	figurine	"EBA/MBA Transitional Period"	c.2100-1950 BC	votive pit	adult woman and female child (not described in detail)		Efe et al.2014:291
İzmir	1	mould		latest EBA	black market	male and female couple, male clothed with robe, hands on abdomen, female naked with necklace and hands on abdomen	probably late EBA on stylistic grounds	Canby 1965:42-51, pl.IX.a-c
Acemhöyük	1	figurine	level IV (=Kültepe karum III-IV)	c.2050-1950 BC	?	male and female couple with child, male clothed with robe, hands on abdomen, female naked with necklace and squeezing breasts		Emre 1971:93, pl.III.3

Figure 7.51. Summary table of lead anthropomorphic figurine and mould finds between Anatolia and Upper Mesopotamia, late 3rd millennium BC.

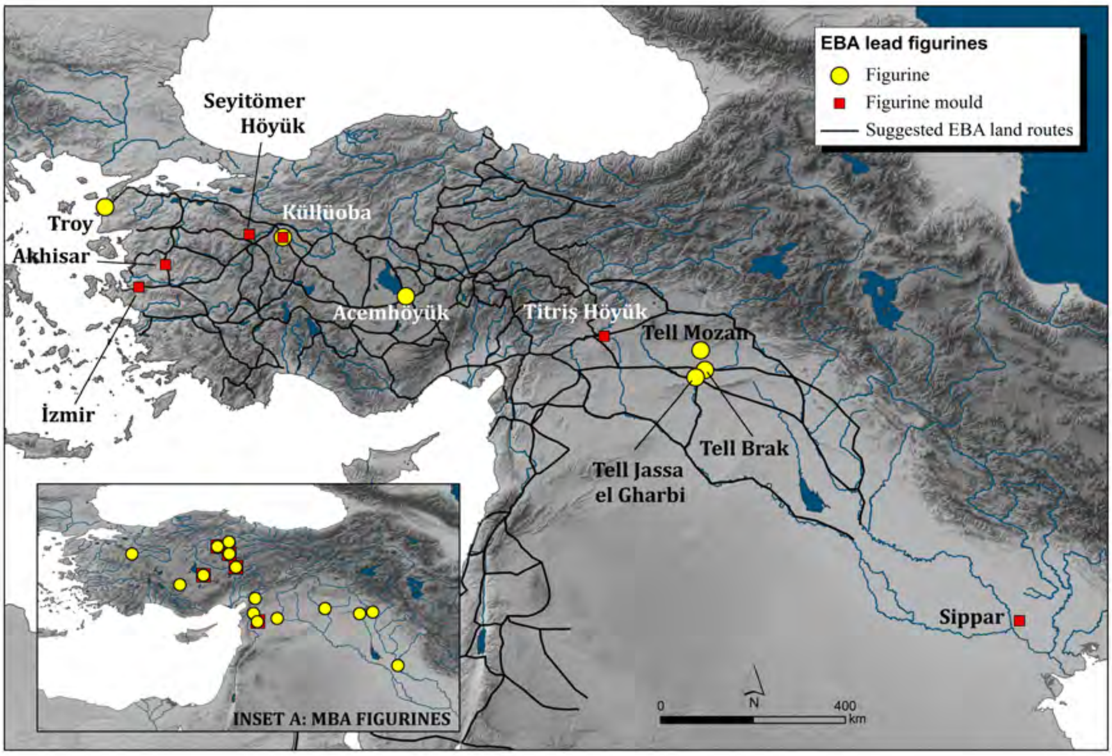

Figure 7.52. Distribution of lead anthropomorphic figurines and moulds for their production in the late 3rd millennium BC (data from table in figure 7.51). Also shown are major EBA routes (for Anatolian routes cf. chapter 3, for Levantine routes Nigro 2014, for Mesopotamian routes cf. Roaf and Collon 1990). Inset shows the distribution of MBA figurines and moulds (data from Marchetti 2003, with additions).

Site	Period	Absolute	Tot	Type	Comments	Reference
Troy	level IIg	2300-2200 cal BC	2	battle axe/cylinder seal	in lazurite (battle axe) and “blauem Feldspath” (seal)	Antonova et a.1996:219-222, cat.no.169; Schliemann 1881:476, fig.502
Bozüyük		c.2400-1950 BC	1	macehead	in "blauem Stein (Lapis lazuli?)"	Koerte 1899:16, pl.IV.2
Acemhöyük	level IV	2080-1930 cal BC	1	bead		Öztan and Arbuckle 2013:279
Kültepe	levels 13-11	c.2400-1950 BC	8	beads/cylinder seals		Özgüç 1986:43-45, figs.3.41-43
Yassıhöyük	level II	c.2100-1950 BC	1	bead		Omura M 2014:420

Figure 7.53. Summary table of lapis lazuli finds in Early Bronze Age Anatolia.

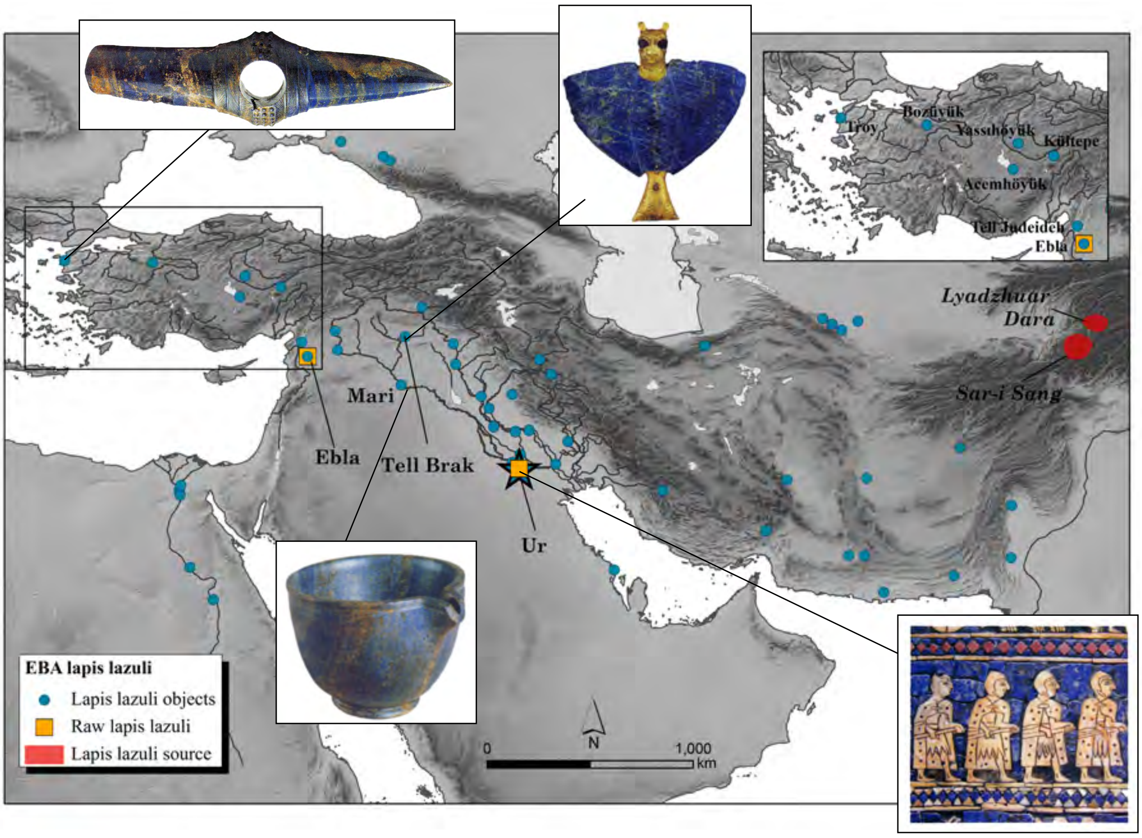

Figure 7.54. Distribution of lapis lazuli artefacts in the Near East during the Early Bronze Age; the star indicates the site of Ur, the findspot of c.75% of all known EBA lapis lazuli artefacts (data from Wilkinson 2014b:fig.4.2; Moorey 1994:85-88). Inset shows the occurrence of lapis lazuli objects in late 3rd millennium western/central Anatolia (data from table in figure 7.53) .

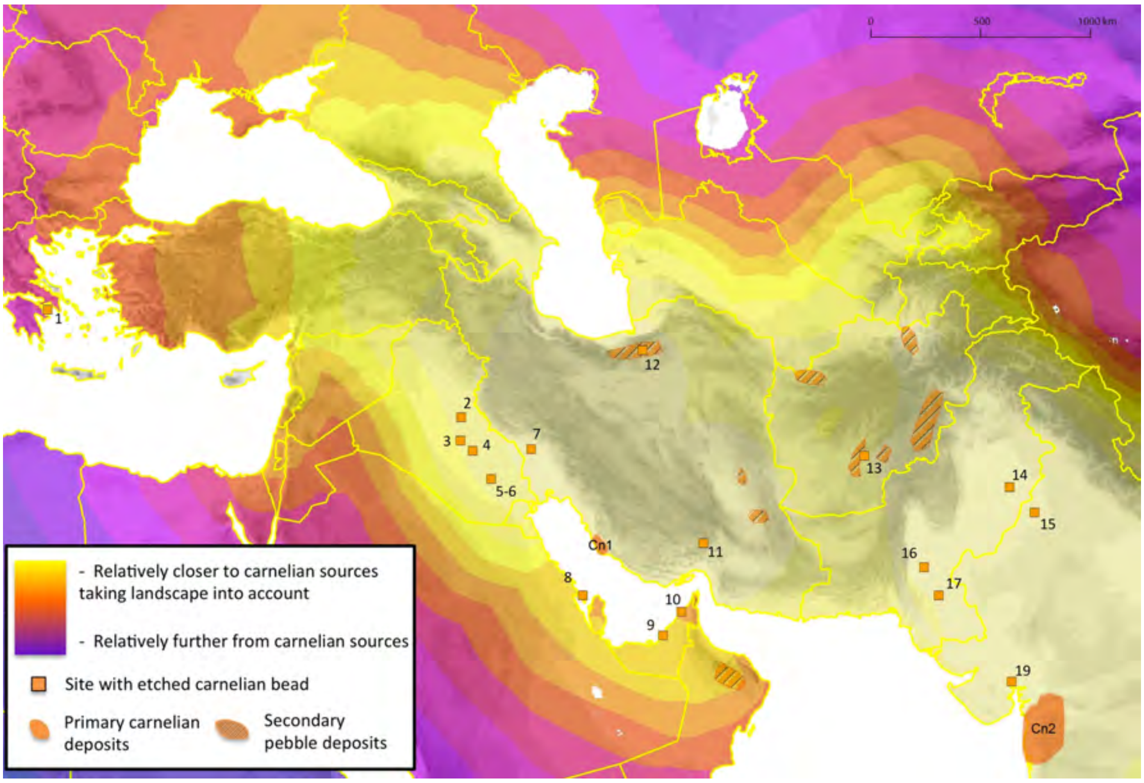

Figure 7.55 Map of the known carnelian sources in the Middle East, together with finds of "etched" carnelian beads in the late EBA. Background colours show the cost-distance from known sources (from Wilkinson 2014b:fig.4.6).

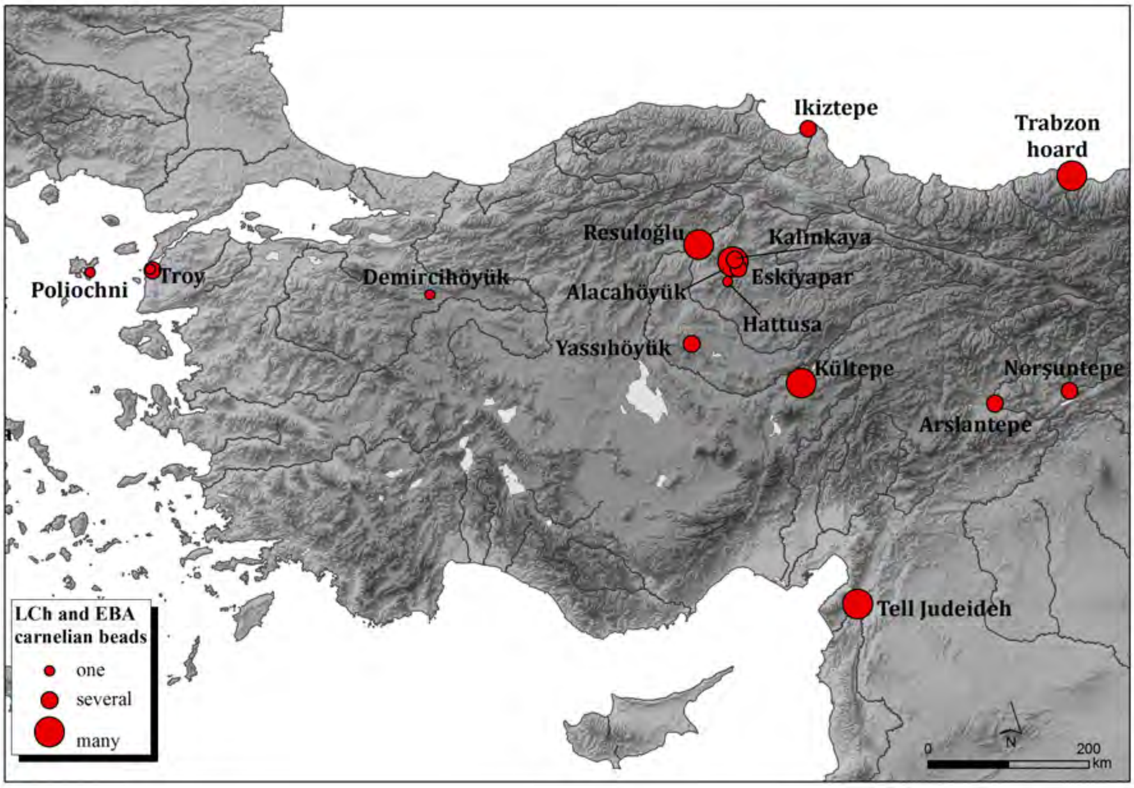

Figure 7.56 Distribution of carnelian objects in wester/central Anatolia during the Late Chalcolithic and Early Bronze Age periods (cf. figure 7.57 for details). Note the absence of carnelian in southern Anatolia.

Site name	Period	Dating	Context	Total	Barrel	Spheroid	Tronco-conic	Cylinder	Elongated	Etched	Other	Reference
Trabzon hoard		4th millennium	hoard	many	many							Rudolph 1978
İkiztepe		late 4th millennium	graves	several								Doğan 2006
Alacahöyük		c.2800-2350 cal BC	"Royal Cemetery"	66			23	43				Arık 1937:62, 99
Demircihöyük	K/Q	c.2700-2550 cal BC	grave 79	2			2					Seeher 2000:75
Kalınkaya		c.2500-1950 BC	grave M-2-71	1							1	Zimmermann 2007:24
Kültepe	level 13	c.2400-2200 BC	grave	57		55					2	Özgüç 1986:43
Poliochni	Yellow	c.2400-2200 BC	hoard	1							1	Bernabò Brea 1976:290
Resuloğlu		c.2300-1950 BC	graves	many	many						many	Yıldırım 2006
Troy	IIg	c.2300-2200 BC	hoards E and L	11	2	1	6				1	Antonova et al. 1996: cat.nos.121-122, 218-221
Troy	III	c.2200-2100 BC	G6 "shrine"	2	1				1			Ludvik et al.2015
Eskiyapar		c.2200-1950 BC	hoard	18	15						3	Özgüç and Temizer 1993:616
Hattusa		c.2100-1950 BC	stray	?					1			Ludvik et al.2014
Yassıhöyük	II	c.2100-1950 BC	"Palace"	11					11			Omura M 2014:421
Aegina (Greece)		c.2200-2000 BC	hoard	19	13				4	1		Reinholdt 2008

Figure 5.57 Summary table of carnelian beads found in western/central Anatolia and Aegean during the late 4th and 3rd millennia BC.

Figure 7.58 Examples of carnelian beads found in EBA Anatolia, at the same scale: a) Eskiyapar (Özgüç and Temizer 1993:pl.115.1); Troy (Antonova et al.1996:cat.no. 121), c) Resuloğlu (httpwww.corumkulturturizm.gov.trTR,58773kazi-alanlari.html), d) Kalınkaya (Zimmermann 2007:fig.8), e) Yassıhöyük (Omura M 2014:fig.12b), f) Hattusa (Ludvik et al.2014:fig.83). Harappan-style elongated beads are represented by specimens (e) and 8f).

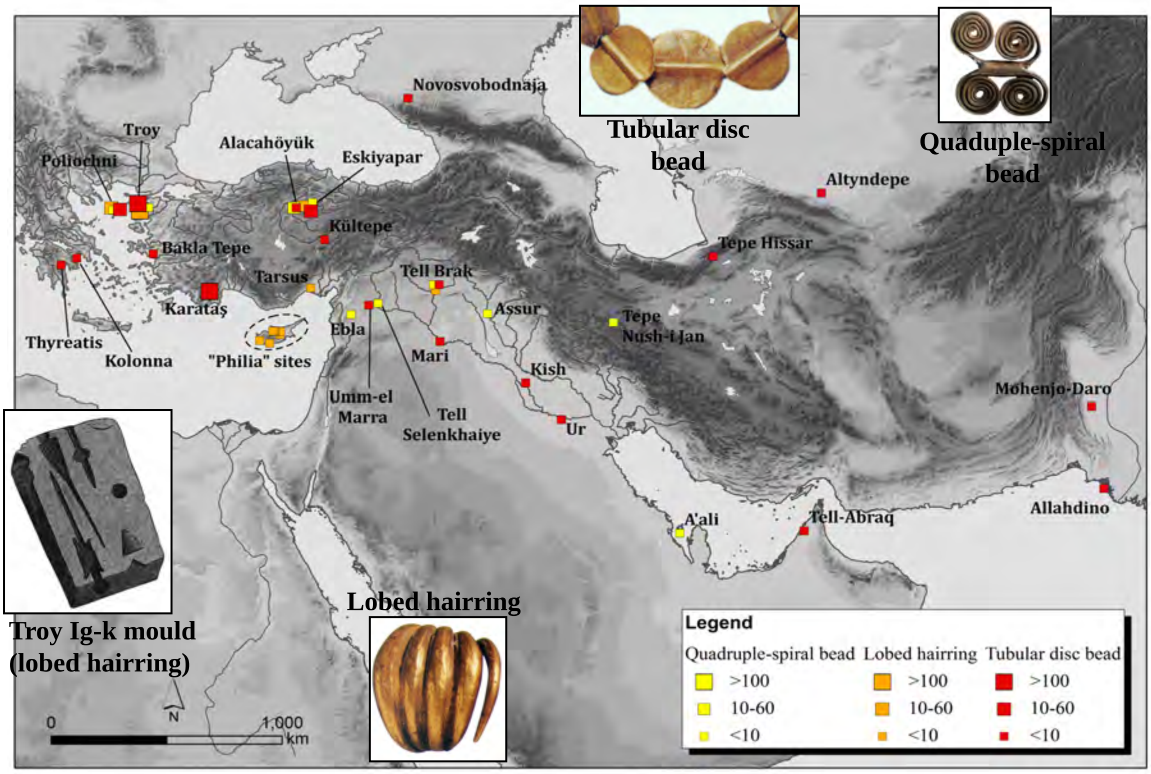

Figure 7.59 Distribution of gold/silver lobed hairrings, tubular disc beads and quadruple-spiralled beads between the Aegean and the Indus valley, c.2600-2000 BC (data from Tonussi 2007:180-221; Wilkinson 2014b, figs.6.47-48, with additions).

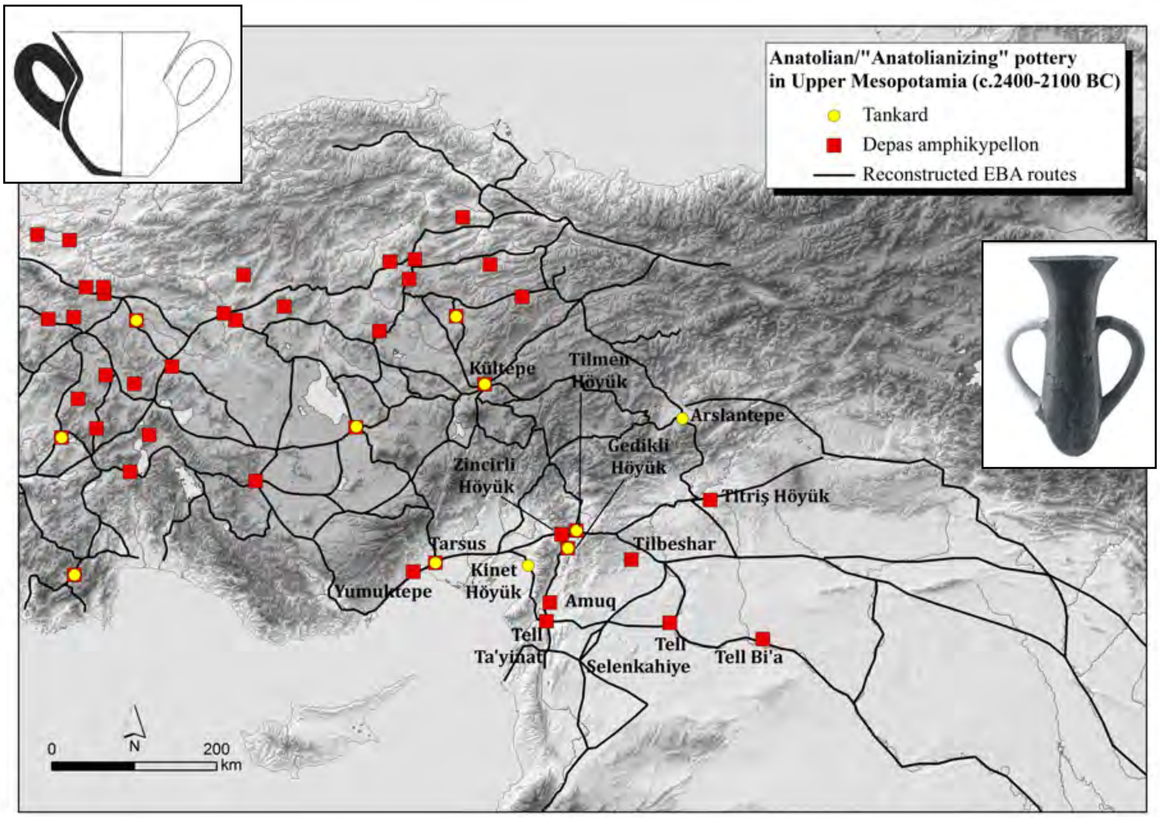

Figure 5.60 Distribution of clay depa and tankards between central Anatolia, Cilicia and Upper Mesopotamia, c.2400-1950 BC (data from Türkteki 2010:maps 2-3). Also indicated are the main EBA routes (for the central Anatolian routes, cf. chapter 3; for the Upper Mesopotamian routes, cf. Roaf and Collon 1990).

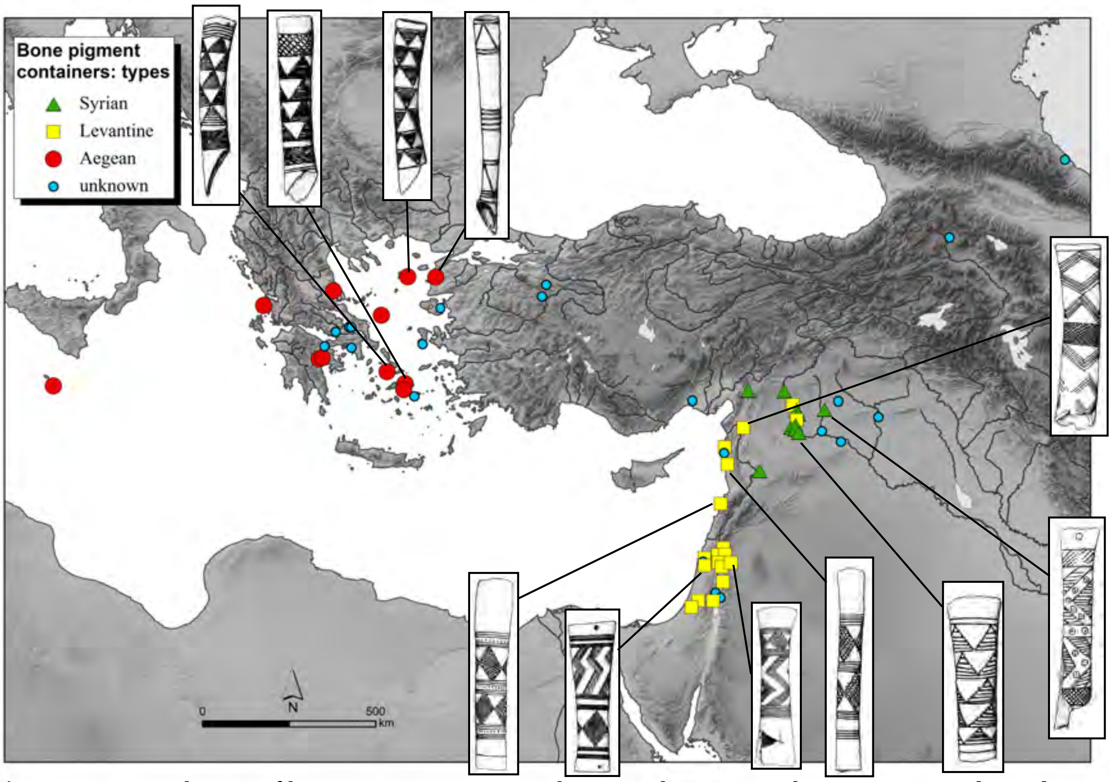

Figure 7.61 Distribution of bone pigment containers between the Aegean, the Levant, Anatolia and Upper Mesopotamia, c.3300-2000 BC (data from Genz 2003; Rahmstorf 2006b:fig.7, with additions).

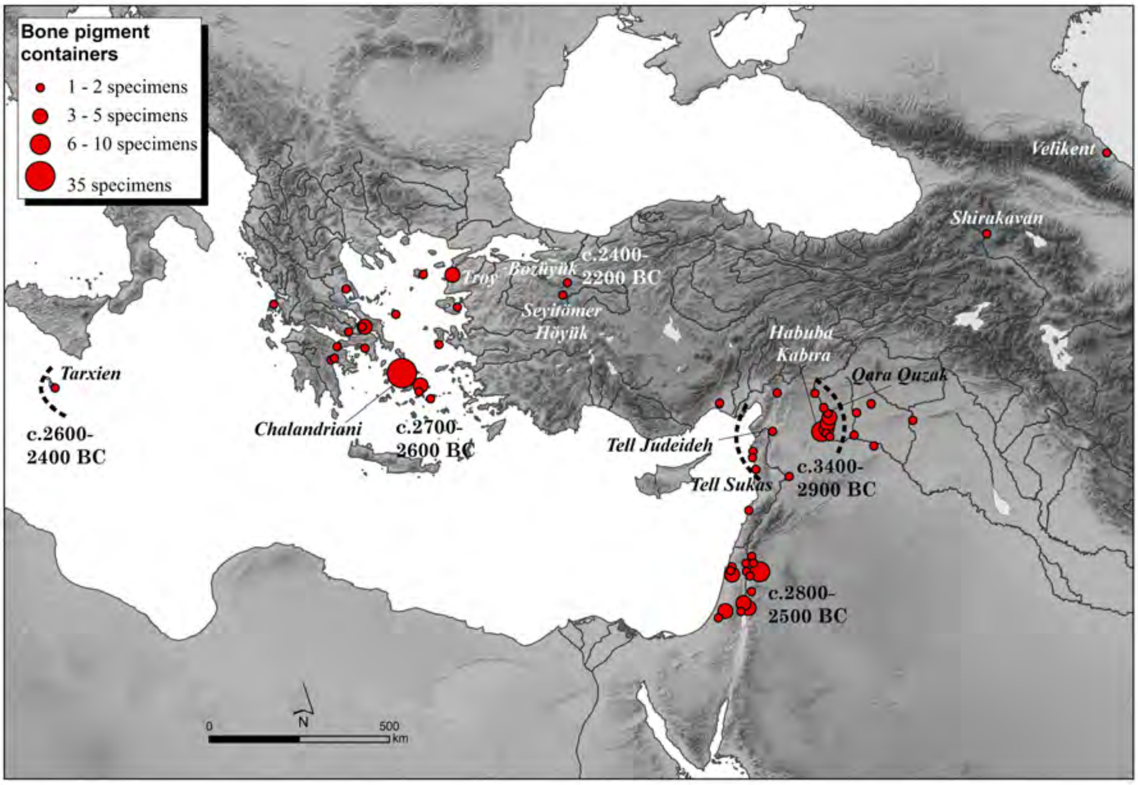

Figure 7.62 Map showing the spread of the bone pigment container shape from the Middle Euphrates valley to other areas, across the Early Bronze Age.

Area	Map. No.	Site	Period	Absolute date	Type	Tot	Specialist assessment	Animal species	Comments	Reference
W Anatolia	1	Poliochni	level Yellow	c.2300-2200 BC	seal	1	x			Bernabò-Brea 1976:298-302; Kenna 1970
	2	Troy	level IIg	c.2300-2200 BC	buttons/appliques/inlays/ knife handle/balance beams	13			not analysed by specialist	Blegen et al.1951:174, 324, 336, cat.nos.35-451, 36-37, 37-548; Schliemann 1881:475-476, figs.532-541
Southern Levant	-	Beersheba	Ghassulian	c.3500-3200 BC	ivory tusks	1		hippo		Moorey 1994:118
	14	Byblos	local EB I-II	c.3200-2800 BC	seal	2				Aruz 2008:42
	16	Ay	local EB IIb/III	c.3000-2500 BC	furniture/comb	3	x			Moorey 1994:121
	17	Jericho	local EB III	c.2900-2500 BC	furniture	1	x	hippo		Moorey 1994:121
	15	Khirbet Kerak	local EB III	c.2900-2500 BC	furniture	1	x	hippo		Moorey 1994:121
	-	Ras Shamra		3rd mill	elephant bones	some	x	elephant		Moorey 1994:118
Crete	-	Knossos	EM IIa	c.2700-2500 BC	raw tusk	1	x	hippo		Krzyszkowska 2005:63
	6	Mochlos	EM II	c.2700-2200 BC	seal	1	x	hippo	local manufacture	CMS II, 1 473
	4	Trapeza Cave	EM II/MM Ia	c.2700-1950 BC	figurine head	1		hippo		Aruz 2008:52
	4	Trapeza Cave	EM II/MM Ia	c.2700-1950 BC	seal	2	x	hippo	local manufacture	CMS II, 1 435, 442
	9	Marathokephalo	EM II/MM Ia	c.2700-1950 BC	seal	3	x	hippo	local manufacture	Krzyszkowska 2005:64-67, cat.no.106, 108, 112
	3	Archanes	EM II/MM Ia	c.2700-1950 BC	figurine	1		hippo	local manufacture	Rehak and Younger 1998:233
	10	Mesara	EM II/MM Ia	c.2700-1950 BC	seal	1		hippo	local manufacture	Aruz 2008:52
	5	Gournia	EM II/MM I	c.2700-1950 BC	seal	1	x		local manufacture	CMS II, 1 469
	7	Ayia Triada	EM III/MM Ia	c.2100-1950 BC	seal	4	x	hippo	local manufacture	Krzyszkowska 2005:64-68, cat.no.104, 107, 110, 113
	11	Platanos	EM III/MM Ia	c.2100-1950 BC	seal	5	x	hippo	local manufacture	Krzyszkowska 2005:64-68, cat.no.105, 109, 111, 116, 117
	3	Archanes	EM III/MM Ia	c.2100-1950 BC	seal	3	x	hippo	local manufacture	CMS II, 1 382, 383, 385, 387
	12	Koumasa	EM III/MM Ia	c.2100-1950 BC	seal	1	x	hippo	local manufacture	Krzyszkowska 2005:64, cat.no.115
	8	Lendas	EM III/MM Ia	c.2100-1950 BC	seal	1	x	hippo	local manufacture	Krzyszkowska 2005:68, cat.no.114
N Mesopotamia	21	Mari	ED III	c.2600-2400 BC	figurine	some	x	elephant?		Moorey 1994:120
	20	Assur	Akkadian period	c.2400-2200 BC	figurine	1	x	elephant?		Moorey 1994:120
	18	Tell Brak	Akkadian period	c.2400-2200 BC	figurine	1	x	elephant?		Moorey 1994:120
S Mesopotamia	26	Ur	ED III	c.2600-2400 BC	figurine	1	x	elephant?		Moorey 1994:120
	23	Kish	Akkadian period	c.2400-2200 BC	handle/comb/furniture	3	x	elephant?		Moorey 1994:120
	24	Adab (Bismaya)		3rd mill	?	some	x	elephant?		Moorey 1994:120
	19	Tepe Gawra		3rd mill	comb	some	x	elephant?		Moorey 1994:120
	22	Tell Asmar		3rd mill	comb	some	x	elephant?		Moorey 1994:120
	25	Tell Ubaid	ED III	c.2600-2400 BC	furniture	1	x	elephant?		Moorey 1994:120

Figure 7.63 Summary table of ivory objects and raw ivory finds in the Aegean, Anatolia and the Near East, c.3500-2000 BC.

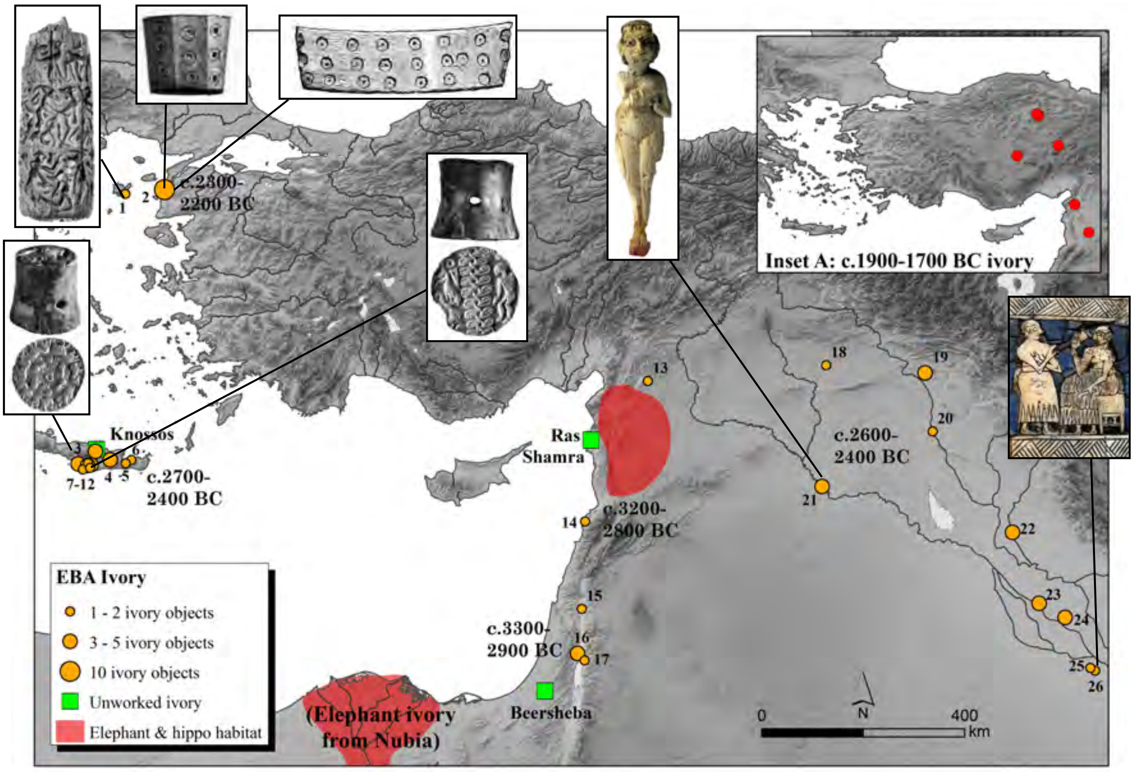

Figure 7.64 Map showing the distribution of ivory objects and raw ivory finds in the Aegean, Anatolia and the Near East, c.3500-2000 BC, and their earliest occurrence in each region; habitat areas of hippopotami and elephants are marked in red. Inset shows the distribution of ivory finds in Middle Bronze Age Anatolia. Data from Bourgeois 1992; Krzyszkowska 2005; Moorey 1994:118-121, with additions.

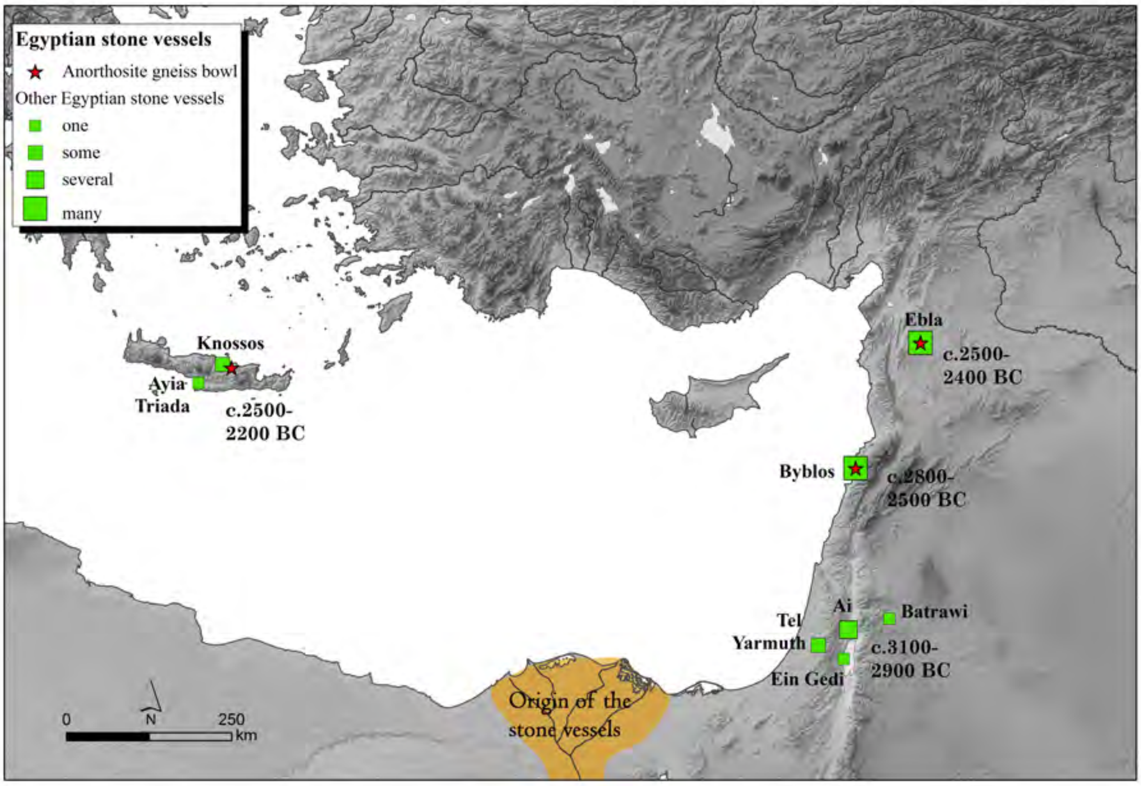

Figure 7.65 Distribution of Egyptian stone vessels between Levant and southern Aegean during the Early Bronze Age, with dates of their earliest appearance in the region (data from Bevan 2007, with additions).

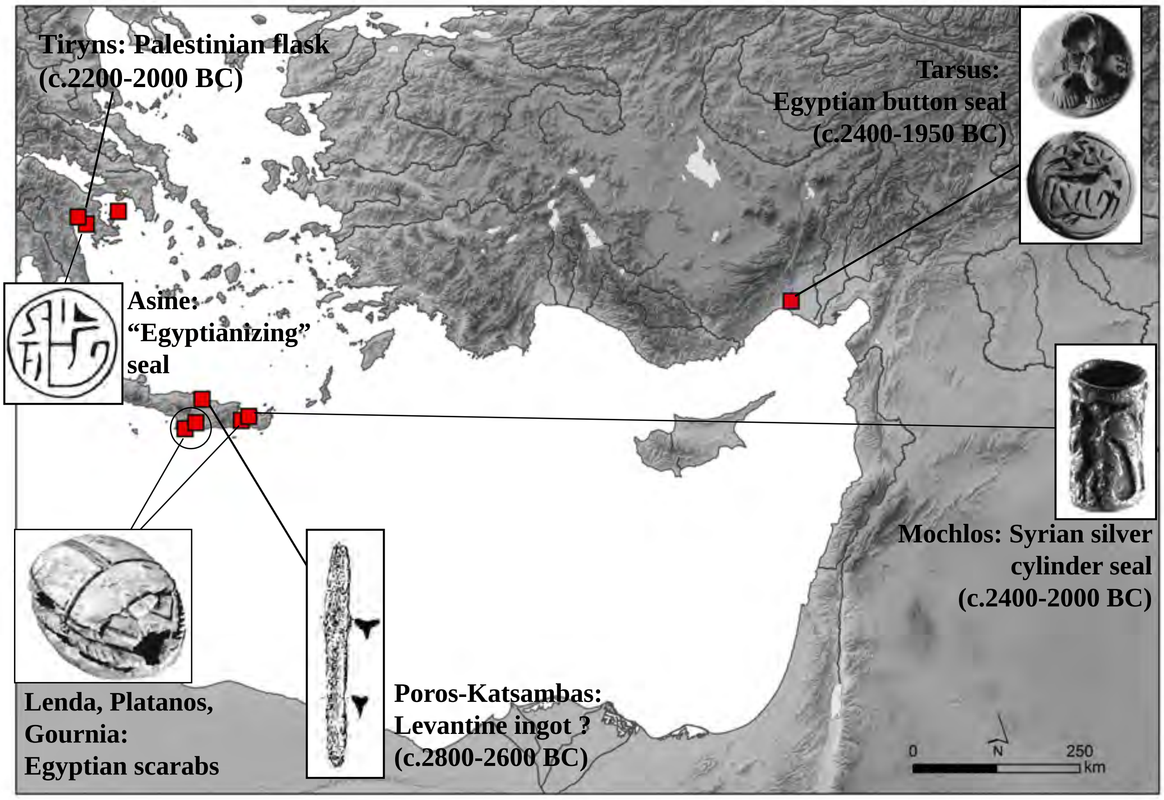

Figure 7.66 Distribution of miscellaneous artefacts of Levantine/Egyptian origin in southern Anatolia, Crete and western Aegean, c.2400-2000 BC (data from Aruz 2008:19, 40, figs.1, 59; Goldman 1956:334, fig.393; Krzyszkowska 2005:73-74, fig.128; Maran 2007:17).

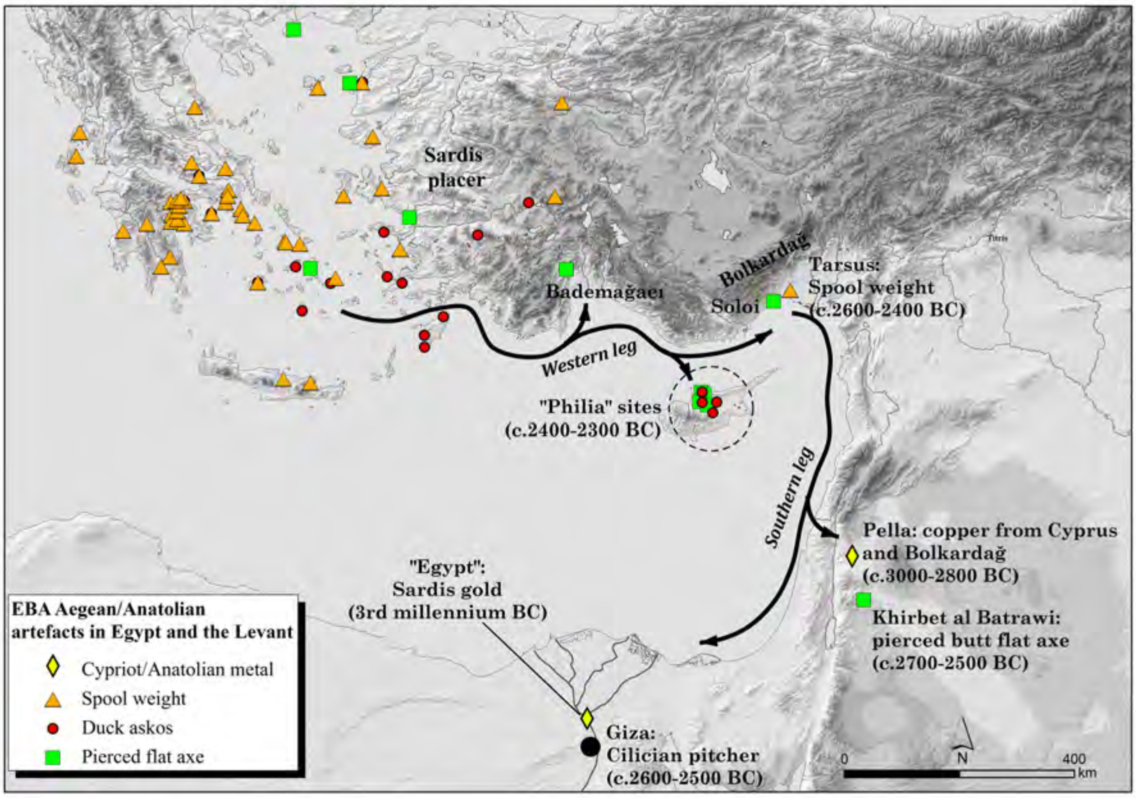

Figure 7.67 Distribution of Aegean and southern Anatolian artefacts in the southern Levant and Egypt, c.3000-2300 BC.

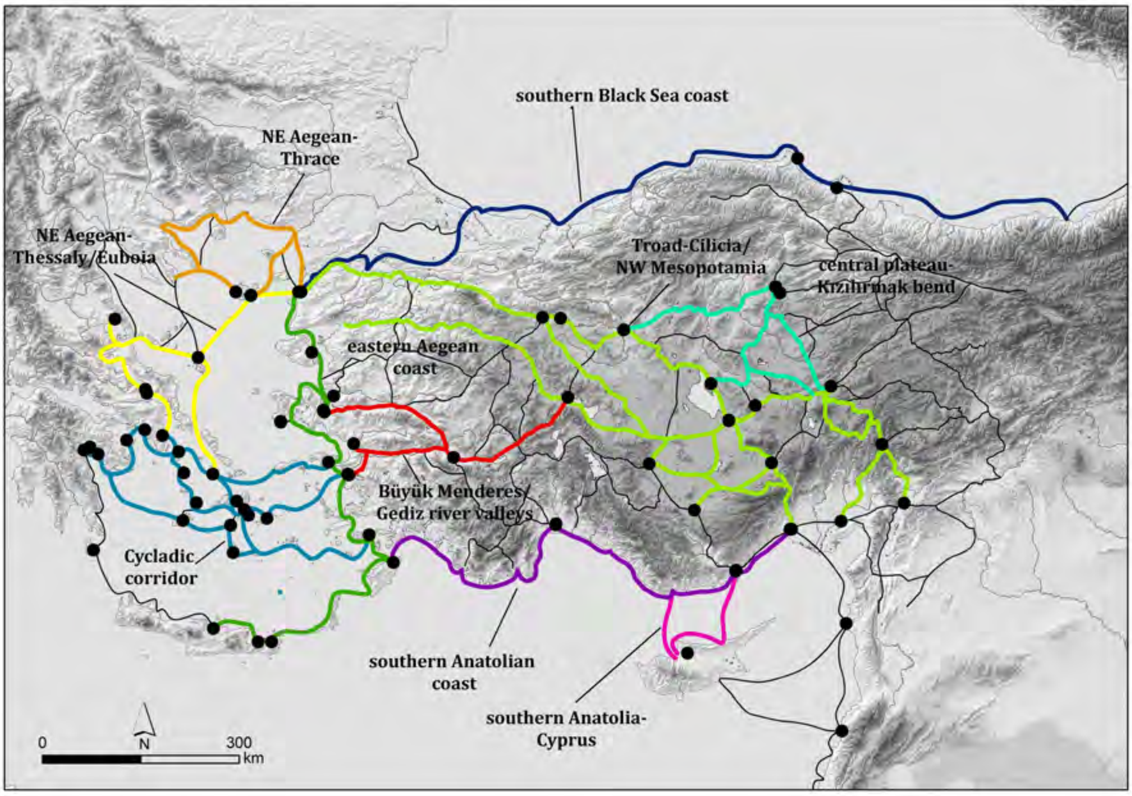

Figure 7.68 In colour are marked the path of the main maritime and overland routes that emerged from mapping the distribution of artefact types discussed in chapters 5-7. The black lines in the background are other routes identified through landscape analysis and later evidence for road use discussed in chapter 3.

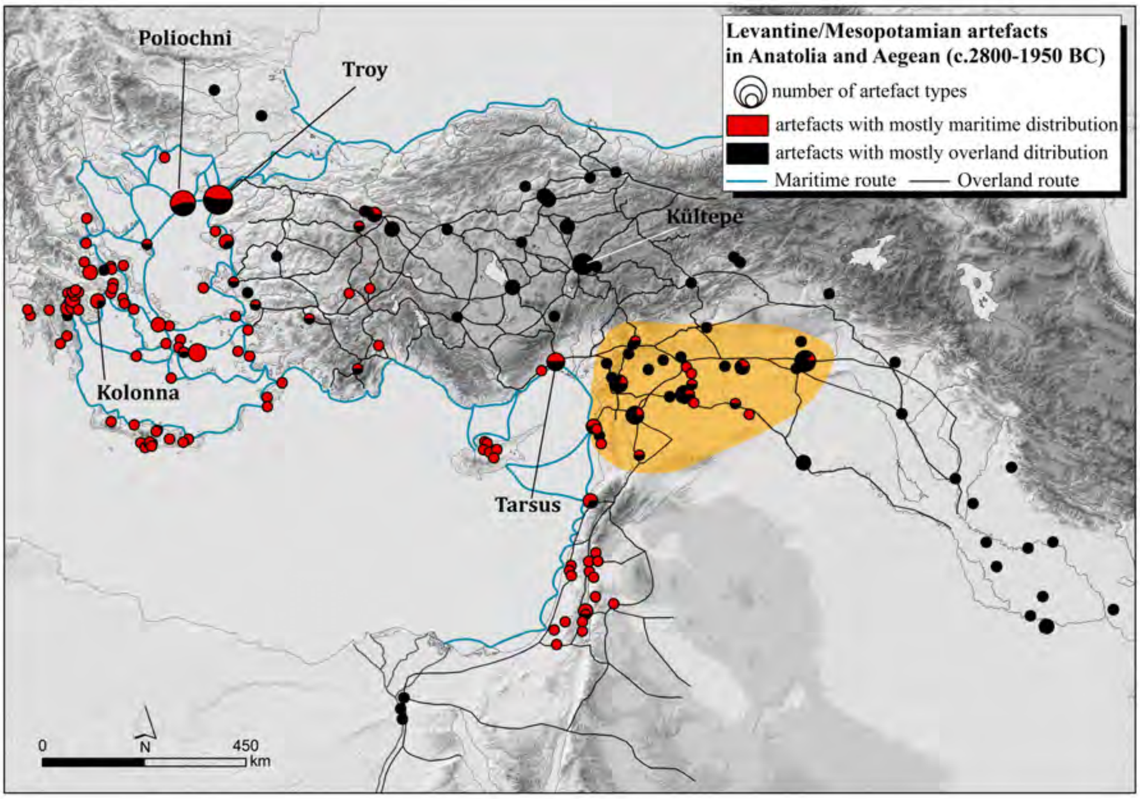

Figure 7.69 Map of sites involved in the interregional networks between Aegean, Anatolia, Levant and Mesopotamia that have at least an artefact treated in section 7.2. Different symbol sizes reflect the number of artefacts identified at each site; artefacts that have mainly a maritime circulation are marked in red, while artefacts with mainly overland circulation are marked in black. To note that northern Levant and northern Syria emerge as the area with the highest proportion of goods from both networks.

Routes		Distance	Longboat (one-way)		Longboat (return)		Sailboat (one-way)		Sailboat (return)	
Point A	Point B		Min (days)	Max (days)	Min (days)	Max (days)	Min (days)	Max (days)	Min (days	Max (days)
Aegina	Tarsus	1400km	42	53	84	106	26	35	52	70
Aegina	Byblos	1750km	52	66	104	132	33	43	66	86

Routes		Distance	Human porter (one-way)		Human porter (return)		Donkey (one-way)		Donkey (return)	
Point A	Point B		Min (days)	Max (days)	Min (days)	Max (days)	Min (days)	Max (days)	Min (days	Max (days)
Troy	Kültepe	950km	40	47	80	94	31	38	62	76
Troy	Zincirli	1200km	50	60	100	120	40	48	80	96
Troy	Ebla	1400km	58	70	116	140	47	56	94	112
Troy	Tell Brak	1600km	66	80	132	160	53	64	106	128
Kültepe	Zincirli	250km	10	12	20	24	8	10	16	20
Kültepe	Ebla	450km	19	22	38	44	15	18	30	36
Kültepe	Tell Brak	650km	27	32	54	64	22	26	44	52

Figure 7.70 Table showing travel times between major centres along the maritime and overland routes connecting Anatolia, Upper Mesopotamia, the Aegean and the Levant (discussed in section 7.3). Travel time is calculated on an average of 8 hours of travel per day, and distances that can be travelled with different transportation means: a) human porter (with load of 15-25kg): 20-24km/day, b) donkey: 25-30 km/day, c) longboat: 40-50km/day (with -30% less due to adverse weather conditions), d) sailboat: 60-80 km/day (with -30% less due to adverse weather conditions).

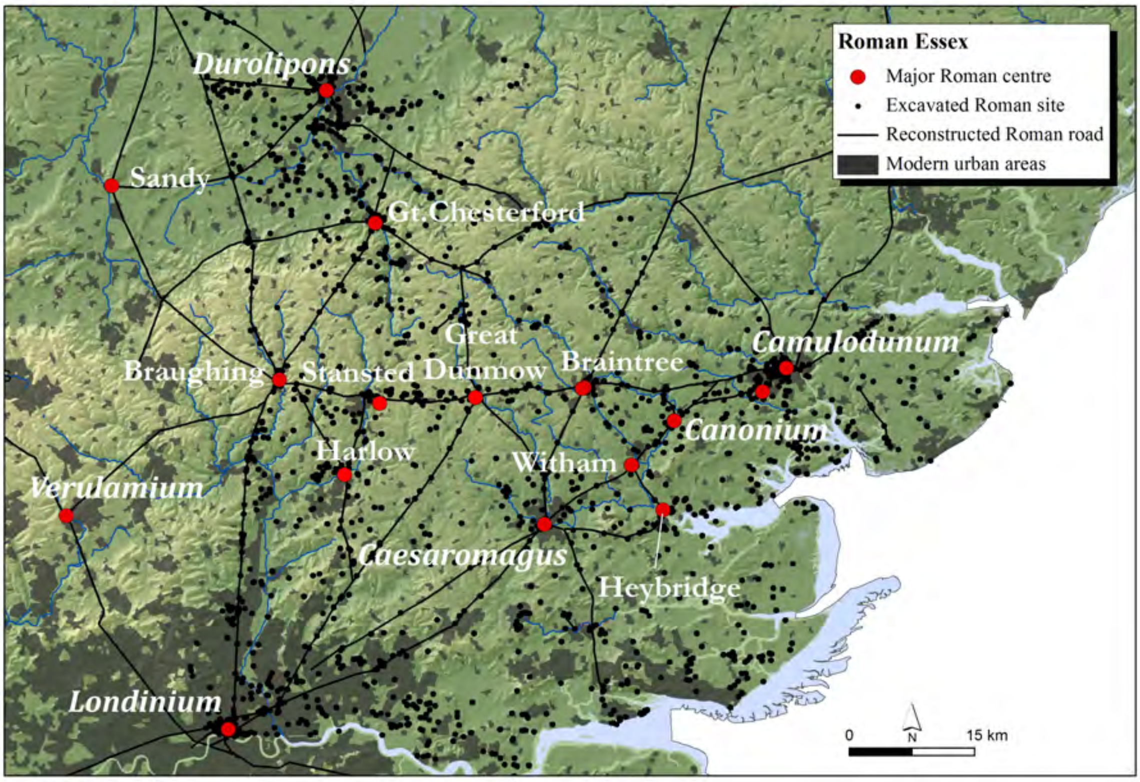

Figure 8.1. Map showing Essex (south-western England), with all known archaeological sites yielding Roman levels, known Roman roads (reconstructed from excavation and aerial photography), and modern urban areas (redrawn from Perring and Pitts 2013:fig.66). Note the high spatial correlation between the major Roman centres and modern urban centres, particularly Londinium (London), Camulodunum (Colchester), Durolipons (Cambridge), Verulamium (St.Albans), and Cesaromagus (Chelmsford).

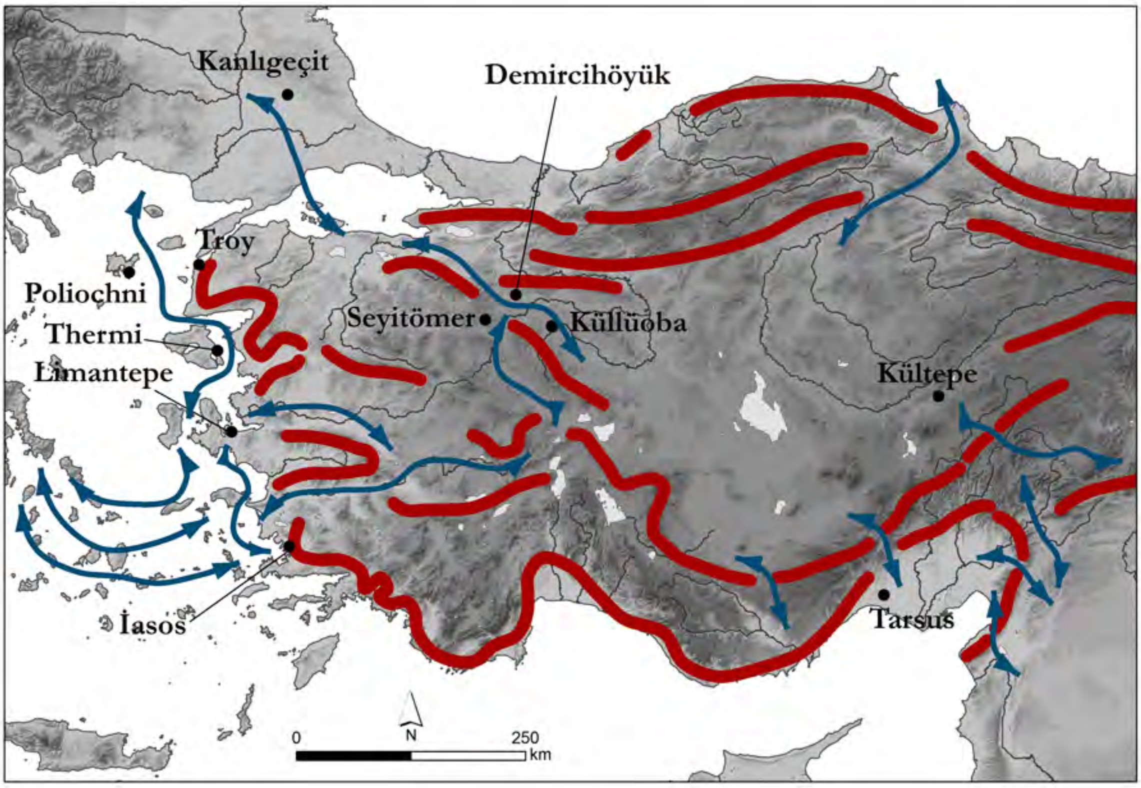

Figure 8.2. Map showing major persistent cultural frontiers (in dark red), permeable interfaces (bi-directional blue arrows) and archaeologically-detectable gateways.

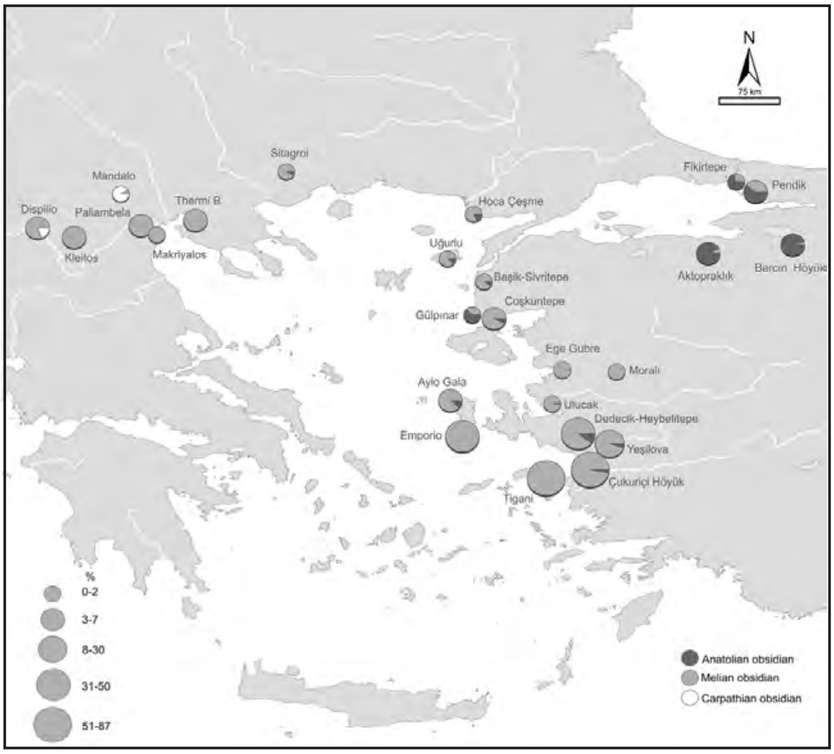

Figure 8.3. Distribution of Neolithic/Middle Chalcolithic (7th-5th millennia BC) obsidian in western Anatolia, showing proportions of obsidian in the chipped stone assemblages of each site, and the proportion of obsidian coming from different sources such as Güllü Dağ/Nenezi Dağ, Melos, and the Carpathians (Milič 2014:fig.2). Note that the quantities of Melian obsidian are much higher at the conjunction between the Cycladic corridor and the Büyük Menderes, with a rapid drop-off at northern Aegean sites and sites further inland.

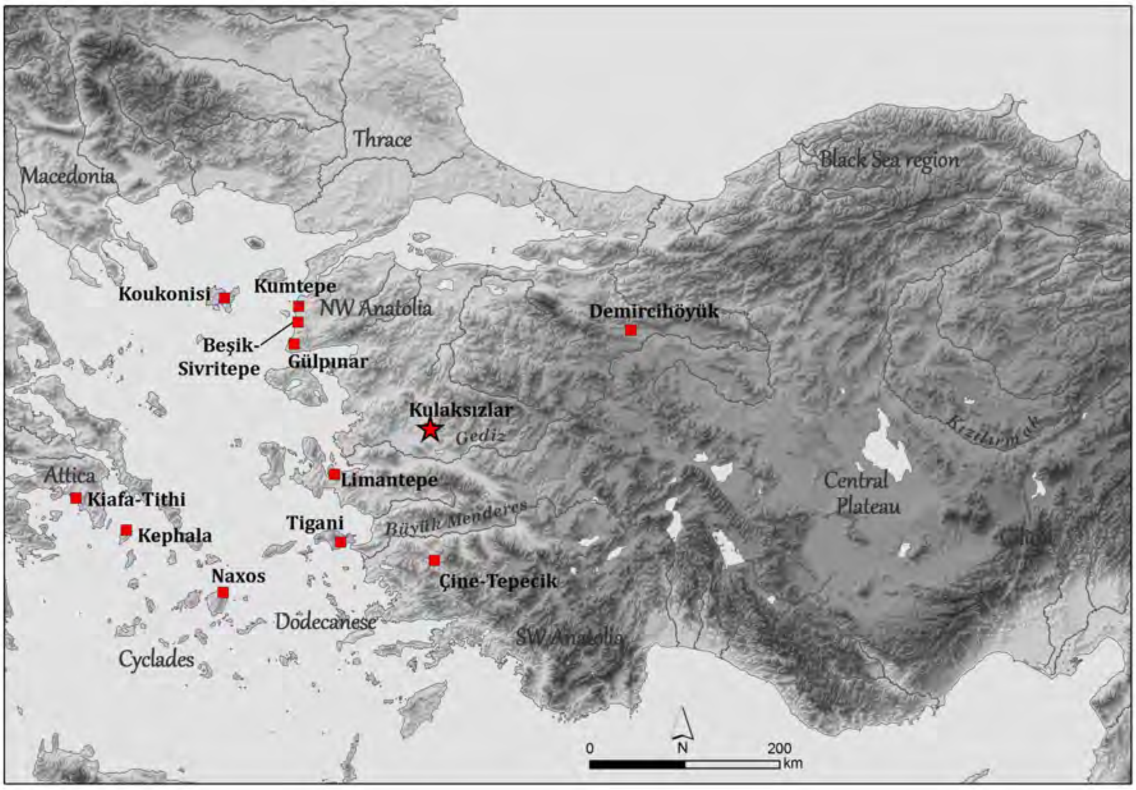

Figure 8.4. Distribution of Middle Chalcolithic (5th millennium BC) marble pointed beakers, that are mostly found along the coast and the “Cycladic/Büyük Menderes” corridor (data from Takaoğlu 2005, with additions). Note that the workshop of Kulaksızlar was one of the production centres of this shape.

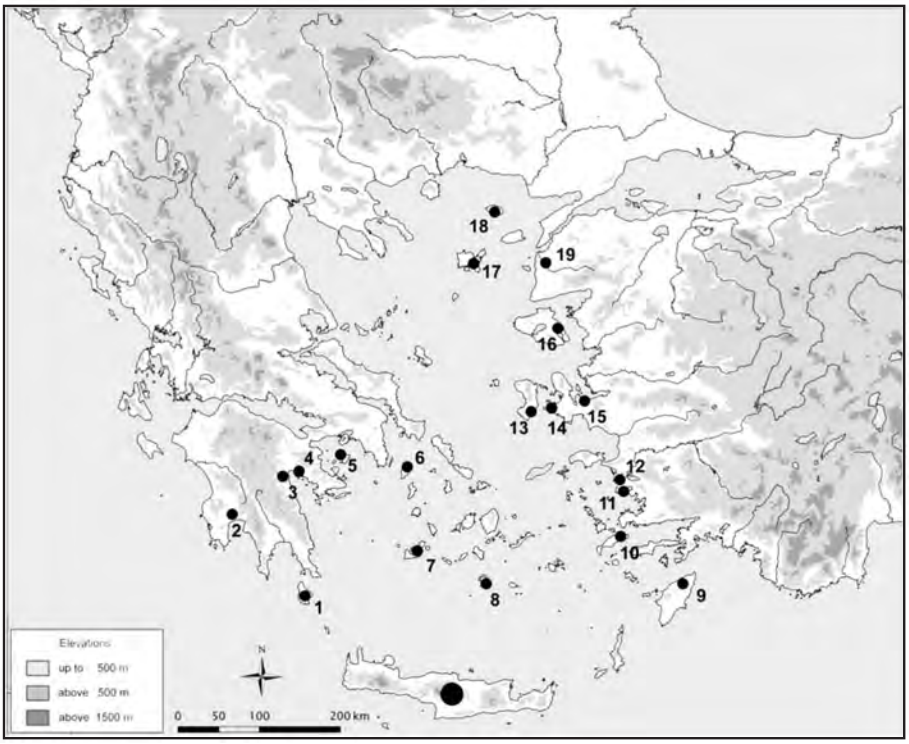

Figure 8.5. Distribution of the so-called "Minoan" grooved discoid loom weights (early 2nd millennium BC), that show a distribution across the Aegean basin and are particularly common in the southern part; in Anatolia, these objects are limited to coastal sites (from Pavuk 2012:pl.XXXIVb). Note that, in Anatolia, their distribution is matched by that of EBA discoid loom weights, the likely predecessors of this shape (cf. fig.7.16).

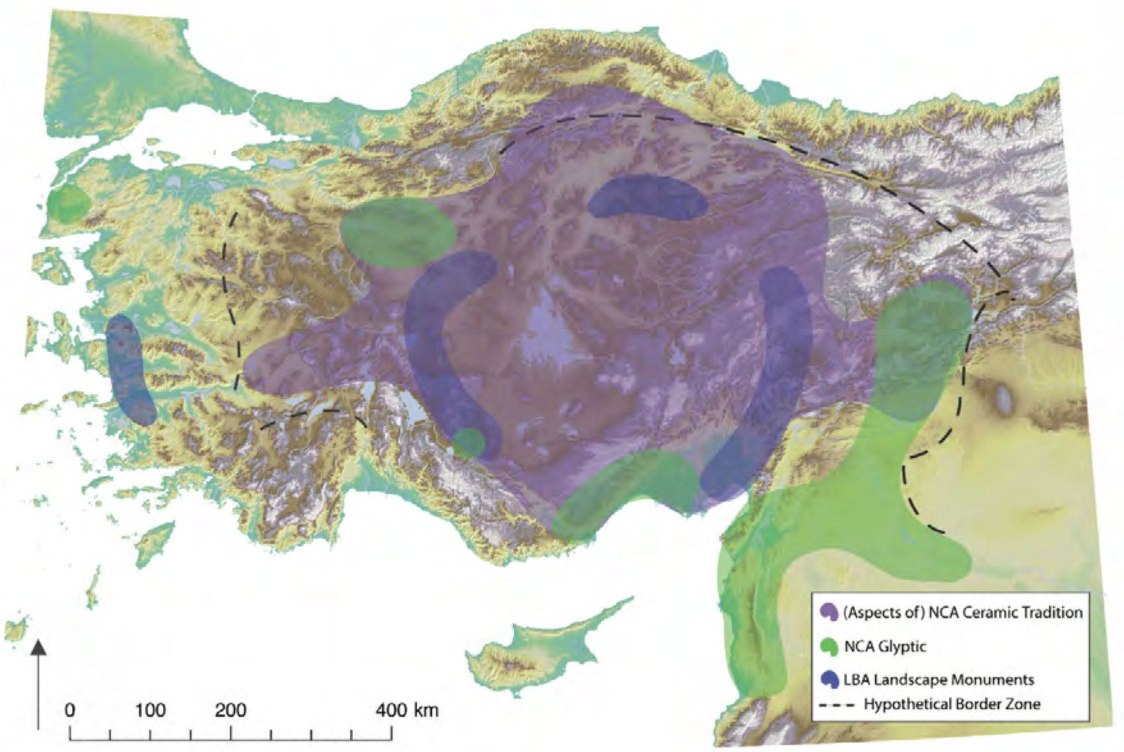

Figure 8.6. Distribution of "Northern Central Anatolian" pottery types (purple) and of Hittite-style landscape monuments (blue), c.1500-1200 BC (from Glatz 2007:map 49). The spatial patterning of these elements suggests on the one side the important "persistent cultural frontier" between the western Anatolian highlands and the plateau, and on the other side the role of the Büyük Menderes as a corridor between inland Anatolia and the coast.

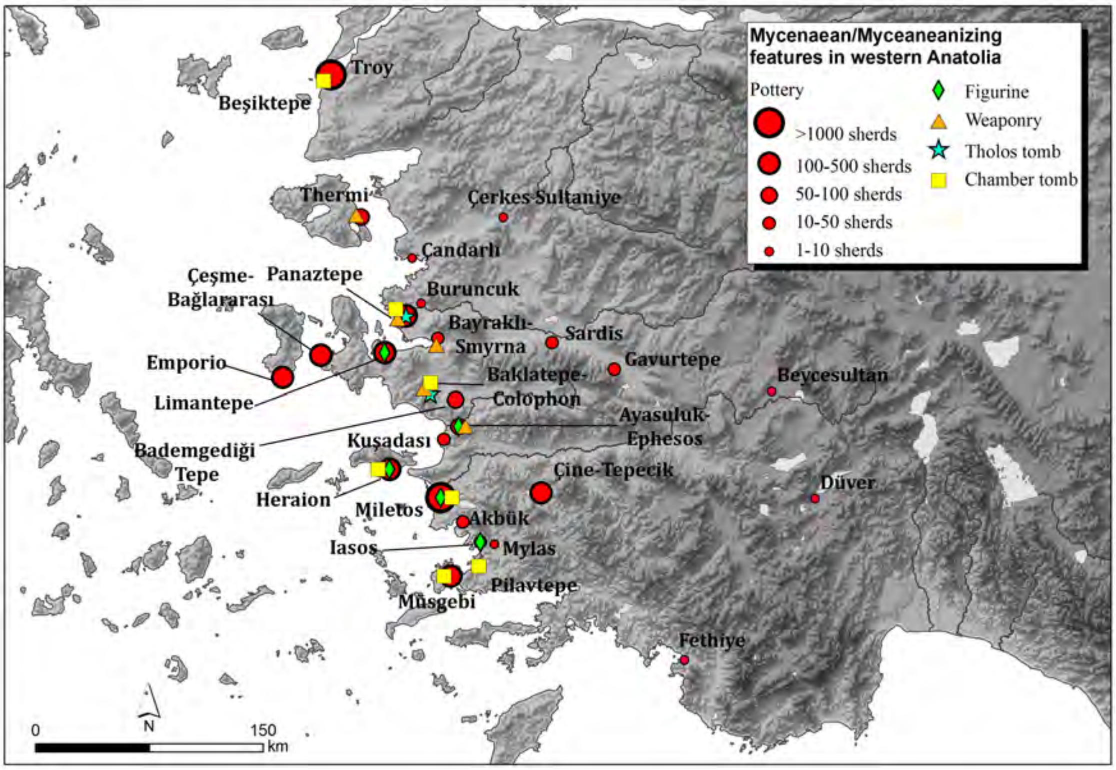

Figure 8.7. Distribution of Mycenaean/“Mycenaeanizing” elements in western Anatolia, c.1400-1200 BC (data from Kelder 2006; Tartaron 2013:fig.7.31, with additions). Their spatial patterning suggests that contacts with the western Aegean were most intense (in terms of quantity and typological range) in the central-eastern Aegean coast between Panaztepe and Müsgebi, and further confirms the role of the Gediz and Büyük Menderes valleys in connecting the coast with inland Anatolia.

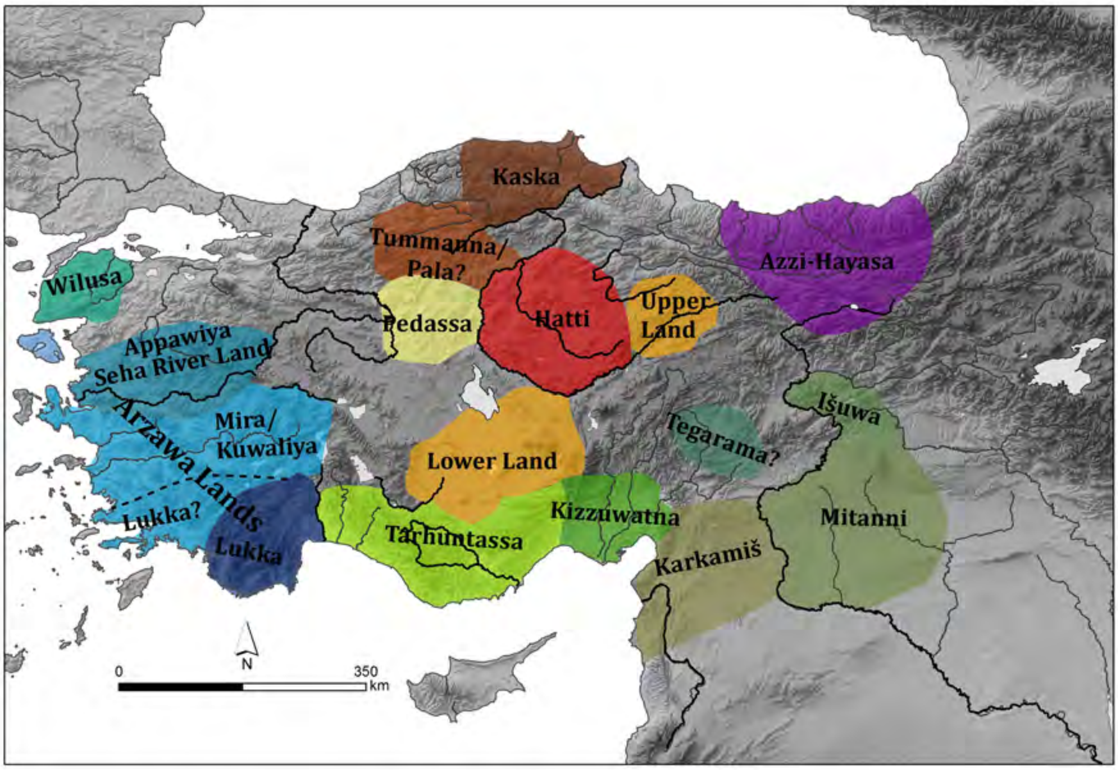

Figure 8.8. Reconstruction of the political geography of LBA kingdoms in Anatolia (c.1400-1200 BC), based on the tentative identification of major centres and topographic features mentioned in Hittite texts and epigraphic monuments (data from Hawkins 2013). Note how the suggested boundaries of individual kingdoms closely match major topographic barriers (in particular between the central plateau and surrounding regions), whose impact on material culture is clearly reflected by the distribution of EBA artefacts.

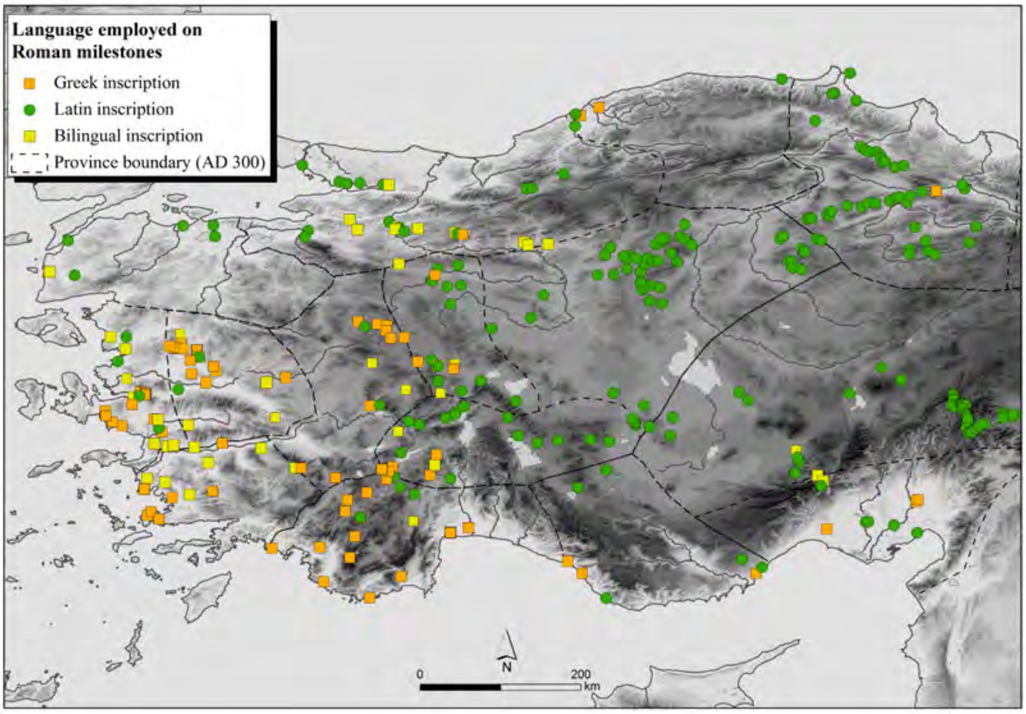

Figure 8.9. Map showing the occurrence of Latin and Greek inscriptions on Roman milestones (AD 1st-5th centuries) and the supposed extent of Roman provinces in the 4th century AD (data from French 2012, 2013a, 2013b, 2013c, 2014a, 2014b, 2014c). Both categories clearly show the role of major topographic barriers in drawing political boundaries and in the differential use of either language on official monuments; the exclusive use of Latin on milestones found in the central plateau is particularly striking. While Greek was adopted in western Anatolian provinces as second official language, the exclusive employment of Latin in central Anatolia may reflect the presence of local languages (Phrygian, Luwian and Lydian among others) not recognised by the Roman Empire (Stephen Mitchell pers.comm.).

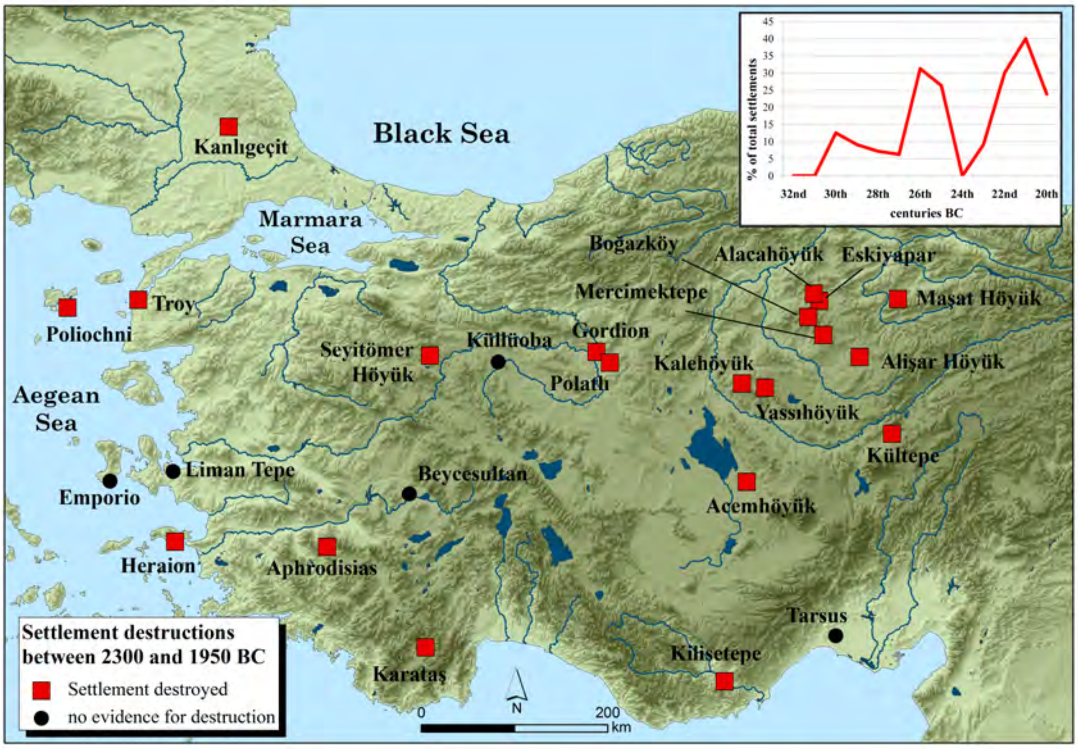

Figure 8.10. Map showing all known stratified contexts spanning the 2300-1900 BC period, and the presence or absence of destruction episodes within individual sites. The chart (inset) indicates the proportion of settlements with evidence for destruction episodes across the EBA, divided by century (data from Massa 2014a:figs.2-4, 8).

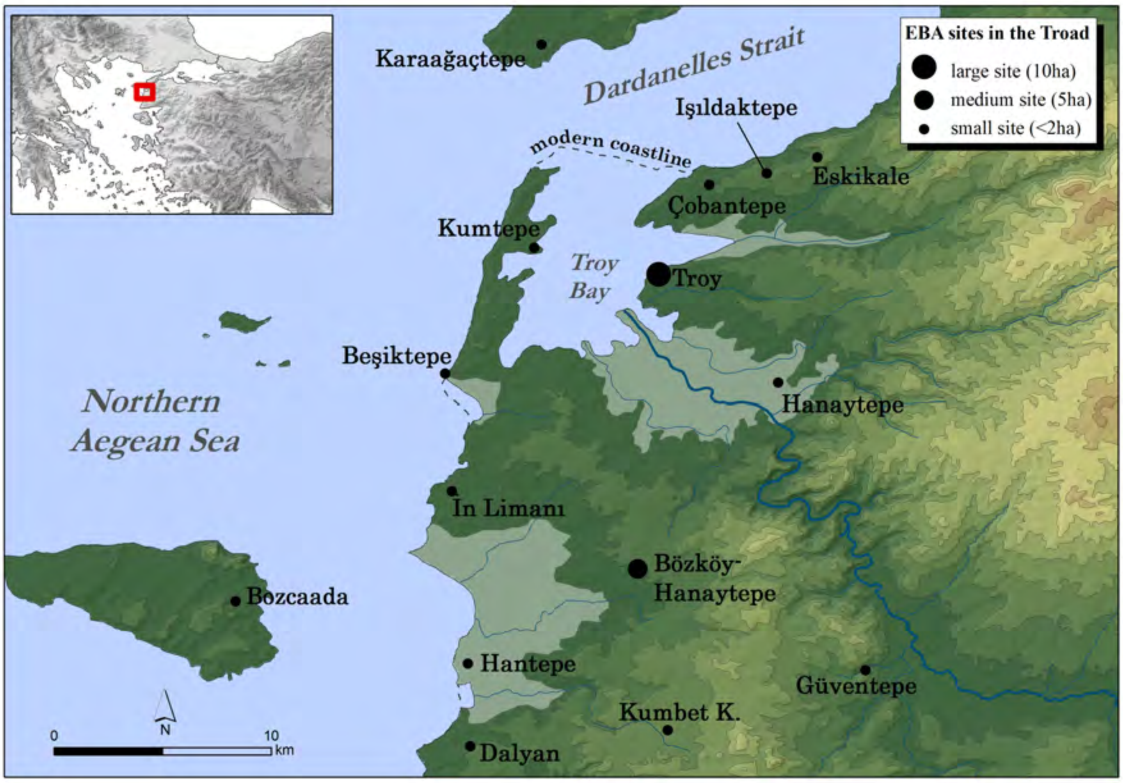

Figure 8.11. Map of the western Troad, showing the location of Troy and surrounding EBA settlements, and the proposed reconstruction of the EBA coastlines (data from Kayan 2014; Bieg et al.2009:fig.1).

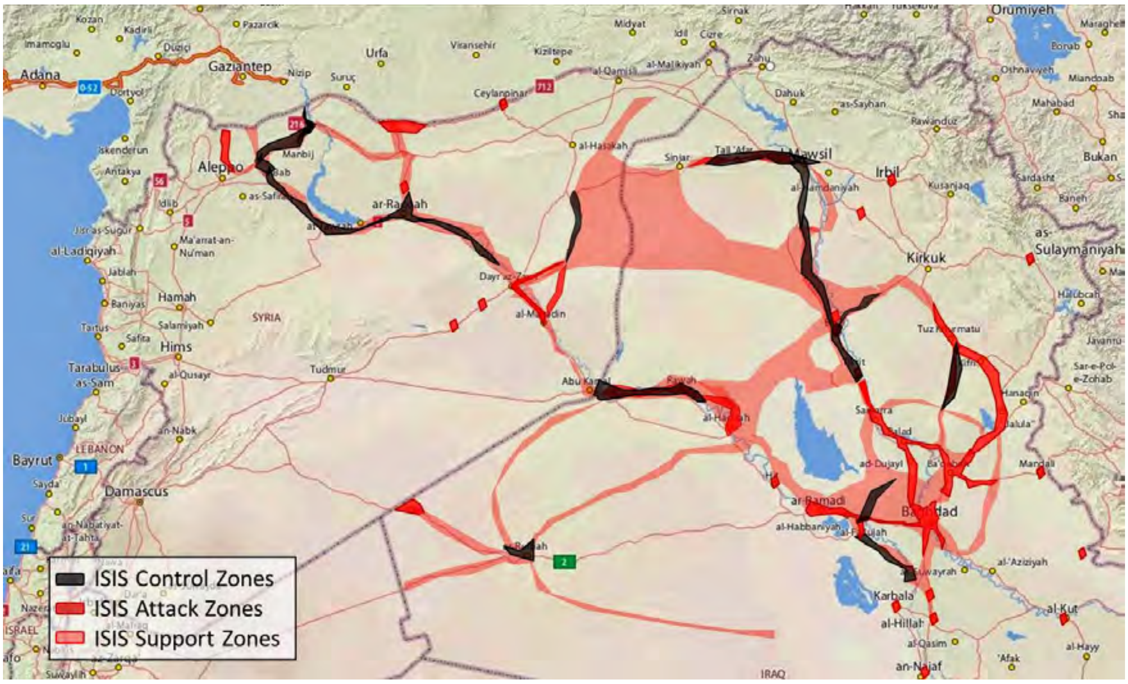

Figure 8.12. Map showing the areas under control of ISIS (Syria and Iraq) in June 2014. Note that the extent of a fluid political entity such as ISIS (at time of war and not recognised as a nation state with fixed boundaries) is best expressed by highlighting its control over major road arteries and network hubs.
Map from: http://iswiraq.blogspot.com.tr/2014_06_29_archive.html [last accessed 01/07/2015].

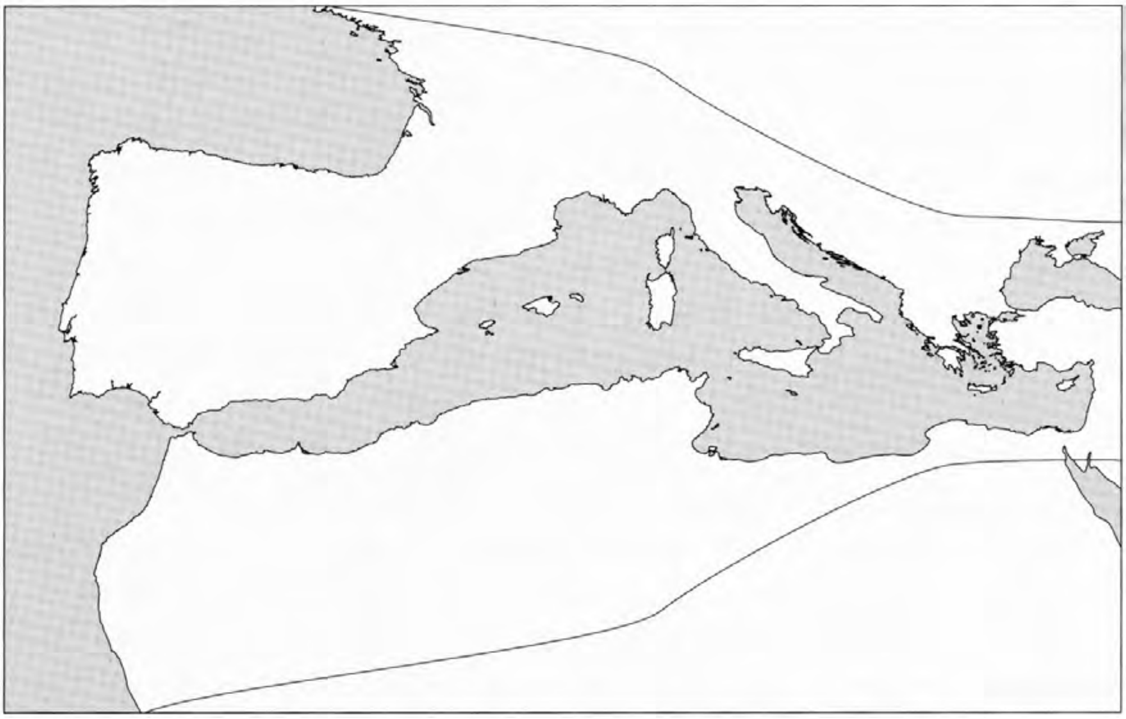

Figure 8.13. Map providing an impressionistic understanding of the distance-shrinking effect of employing sailing boats in the eastern Mediterranean during the 2nd millennium BC, compared to the absence of sail technology in the western part of the basin (from Broodbank 2014:fig.8.54).

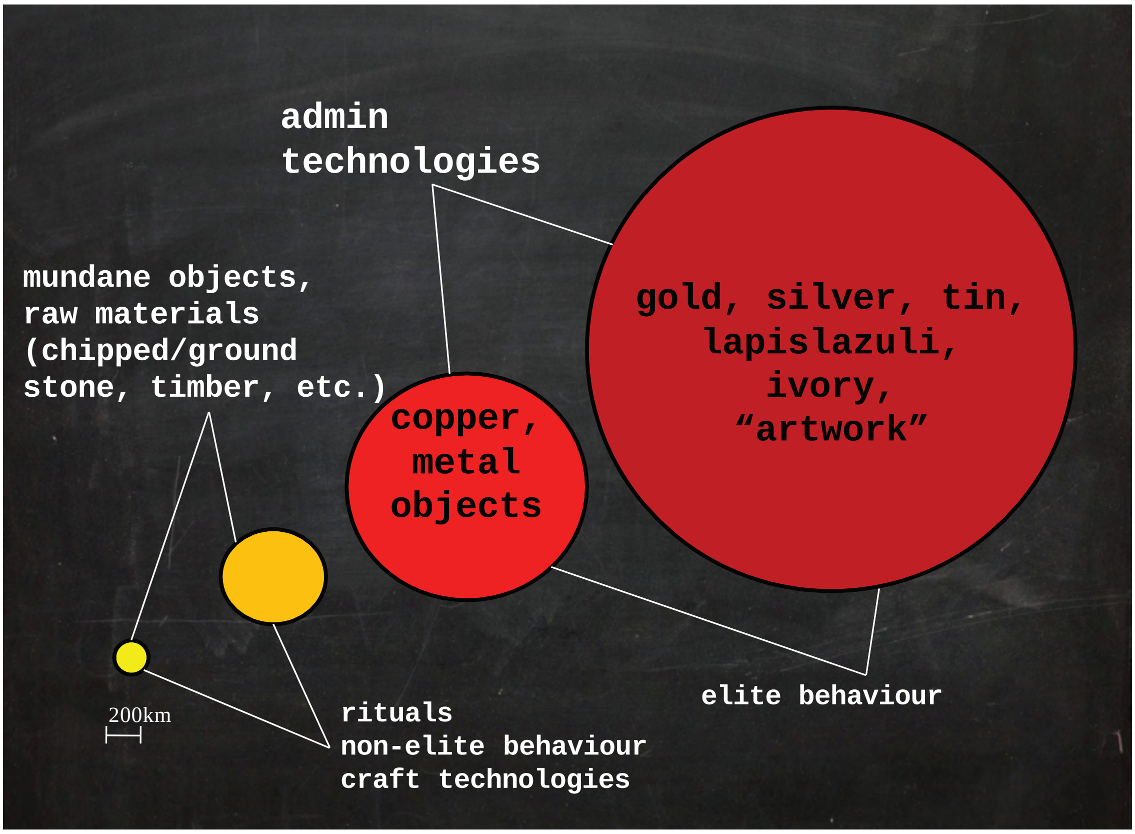

Figure 8.14. Figure showing the approximate spatial extent of networks within which different cultural traits may have circulated during the EBA.

Site	Size	Publication Level	Lead figurines	Tubular discoid beads	Quadruple-spiral beads	Lobate rings	Lapis lazuli objects	Ivory objects	Bone pigment containers	"Syrian" botles	Beakers	Harappan-style carnelian beads	Mesopotamian cylinder seals	Balance weights	Scales	Tin bronzes >30%	Tot
Troy	10ha	High	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
Kültepe	30ha+	Low		1	1	1	1			1	1		1	1		1	9
Poliochni	8ha	High		1	1			1	1				1	1	1	1	8
Tarsus	12ha+	High				1			1	1	1		1	1			6
Eskiyapar	9ha	Low		1	1	1				1	1						5
Alacahöyük	10ha	Medium		1	1					1			1			1	5
Küllüoba	6ha	High	1							1	1			1	1		5
Alişar Höyük	20ha	High								1			1	1	1	1	5
Seyitömer Höyük	2ha	Low	1							1			1	1			4
Bozüyük	2-5ha	Low					1		1						1		3
Acemhöyük	30ha+	Low	1				1			1							3
Yassıhöyük	25ha+	Low					1					1					2

Figure 8.15. Table showing the occurrence of artefacts associated with interregional exchange networks at EBA Anatolian sites. All sites with more than one category present are listed. Note that these represent some of the largest settlements in EBA Anatolia (with the exception of Seyitömer Höyük and Bozüyük) and are all located along major trunk routes.

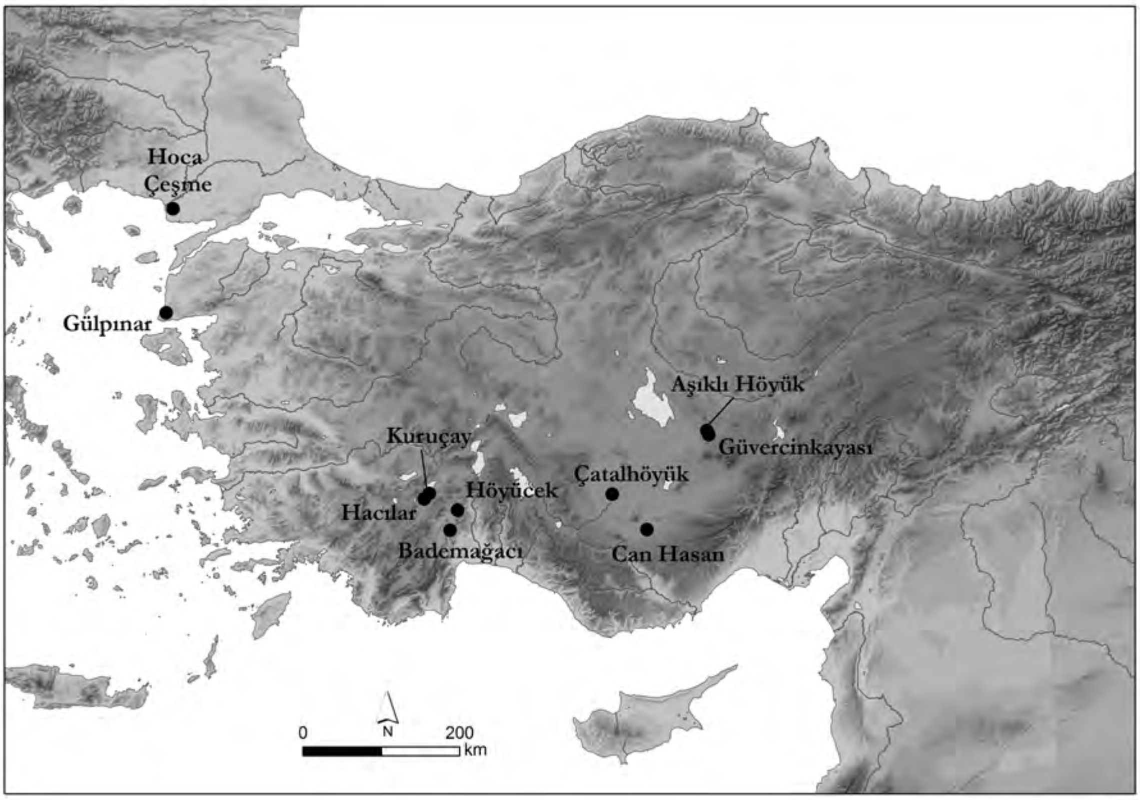

Figure 8.16. Map of Neolithic, Early Chalcolithic and Middle Chalcolithic sites mentioned in the text.

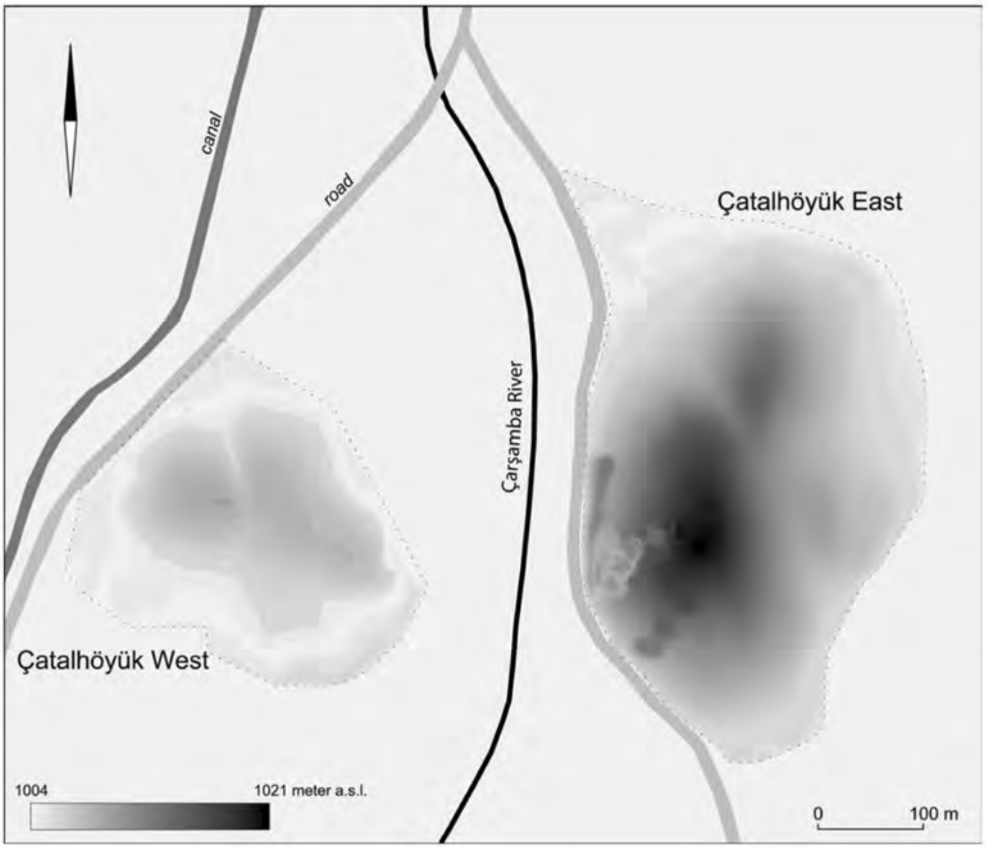

Figure 8.17. Topographic map of Çatalhöyük's East and West mounds (Düring 2007:fig.2).

Figure 8.18. Plan of Çatalhöyük level VIB, showing individual buildings and numbers of sub-floor burials per structure (Düring 2007:fig.2).

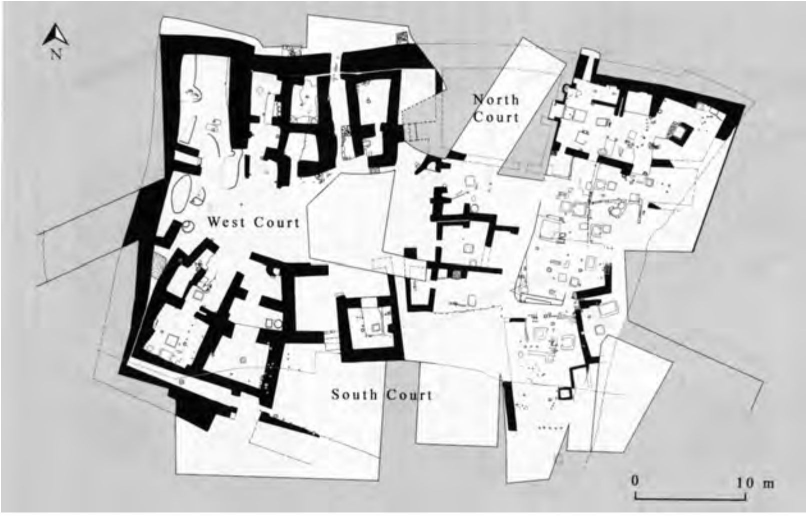

Figure 8.19. Plan of ECh Hacılar IIA, showing external enclosure wall (Sagona and Zimansky 2009: fig.4.24).

Figure 8.20. Photo of Gülpınar's MCh enclosure wall with buttresses (Özgünel 2013:fig.2).

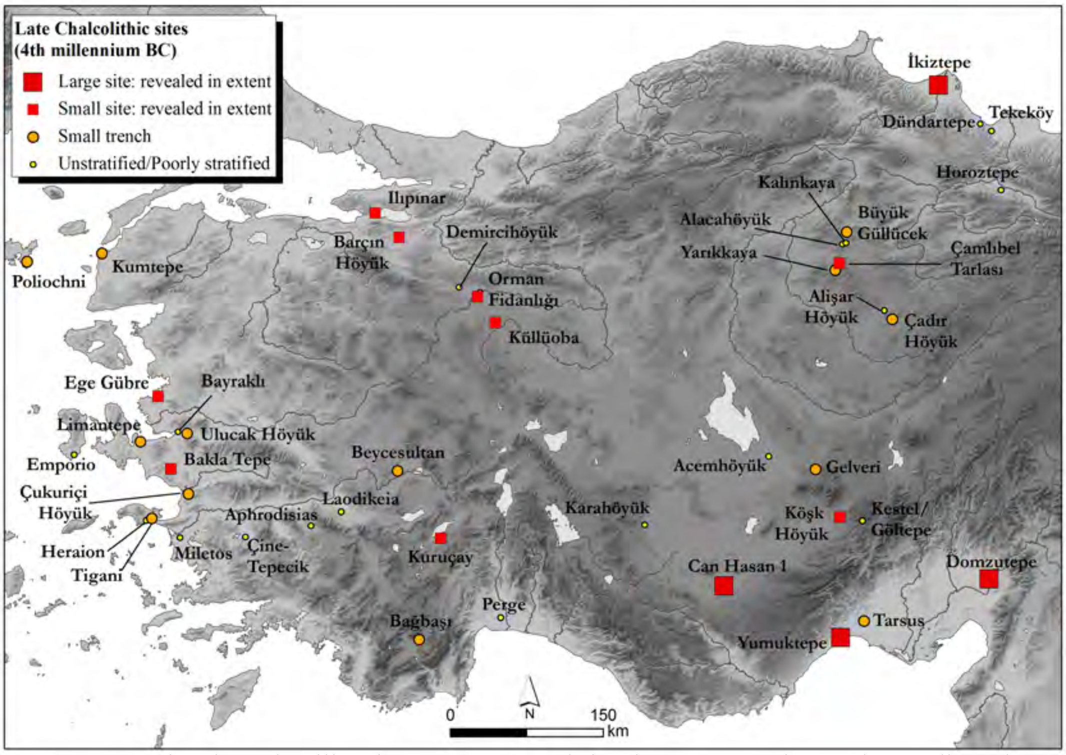

Figure 8.21. Map showing 4th millennium BC excavated sites in western and central Anatolia and assessed on the basis of their level of investigation (data from tayproject.org, with additions). Note that many large EBA site also have LCh levels that are however known only from secondary deposits or small soundings.

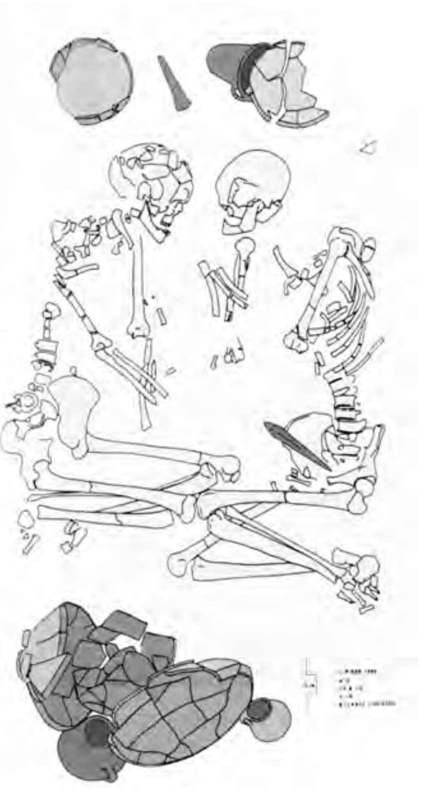

Figure 8.22. Late Chalcolithic male/female double burial at Ilıpınar (İznik), with copper dagger and copper flat axe; radiocarbon samples from the human bones directly date the burial to 3800-3550 cal BC (Roodenberg 2008:320, fig.5).

Figure 8.23. General plan of Hacılar Büyük Höyük level İTÇ 1/I, whose destruction level is radiocarbon-dated c.3000-2900 cal BC (redrawn from Umurtak and Duru 2014:fig.4).

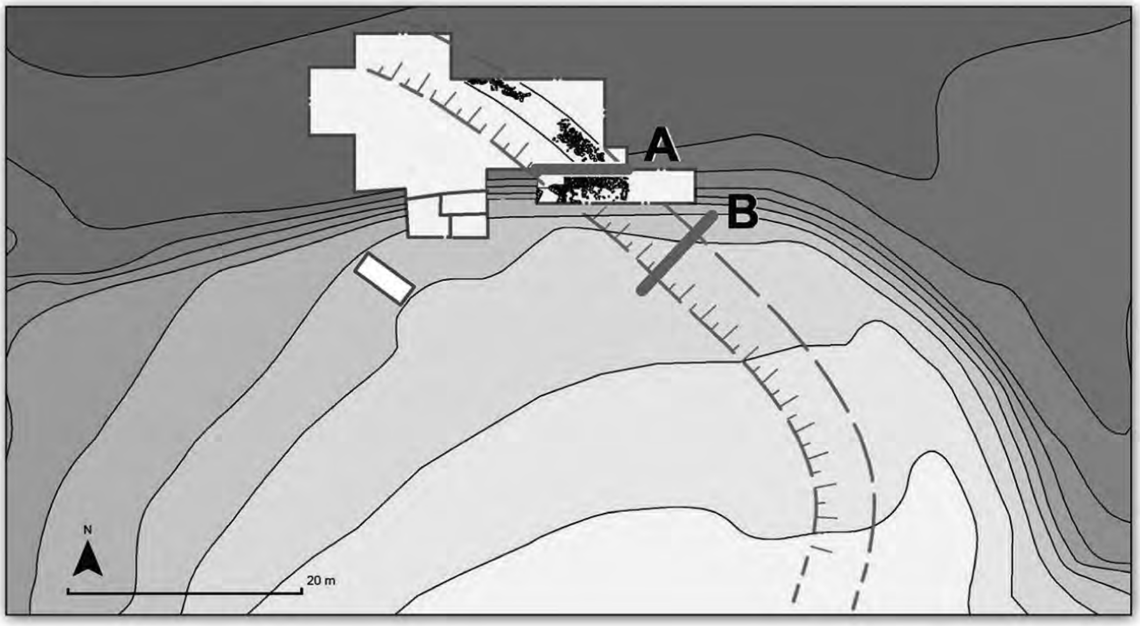

Figure 8.24. Late Chalcolithic ditch at Çukuriçi Höyük (İzmir), as revealed by excavation and geophysical survey; radiocarbon samples from earlier and later layers date the construction and use of the ditch between c.3300-2900 cal BC (Horejs 2014:22, fig.5).

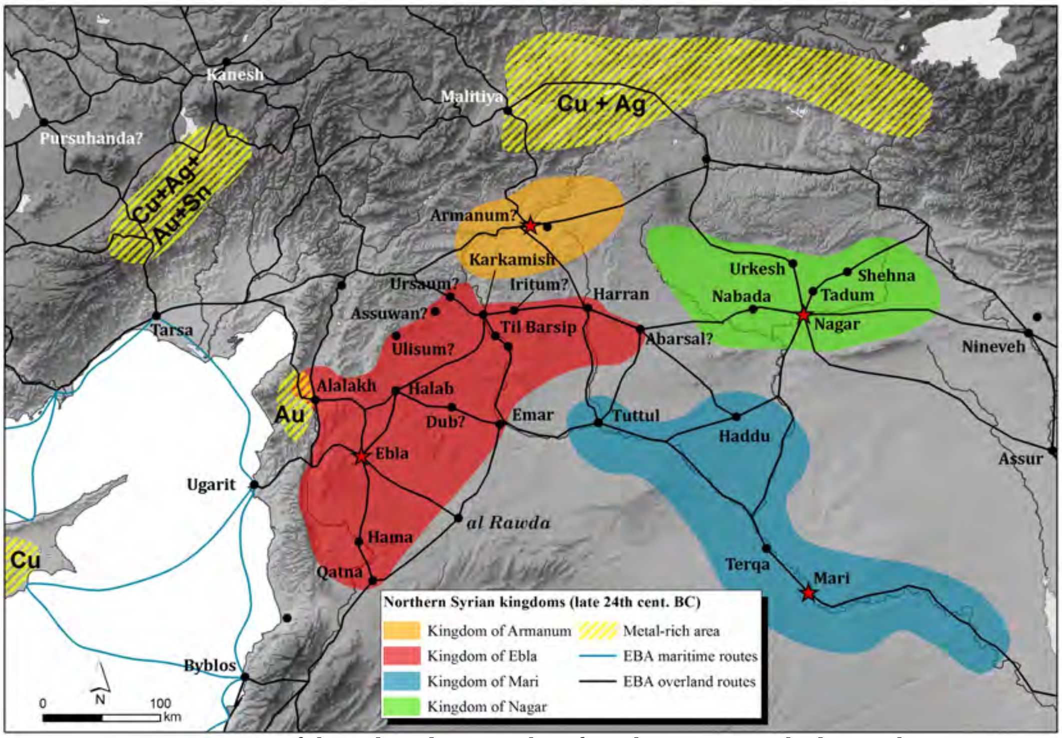

Figure 8.25. Reconstruction of the political geography of northern Syria in the late 24th century BC, prior to Akkadian conquest of the area, and the location of major metal sources. Shaded area represent the maximum extent of the control exercised by the four major centres (Armanum, Ebla, Nagar and Mari), including territories of satellite city-states; based on written documents from Ebla's archives (data from Archi 2011, 2013).

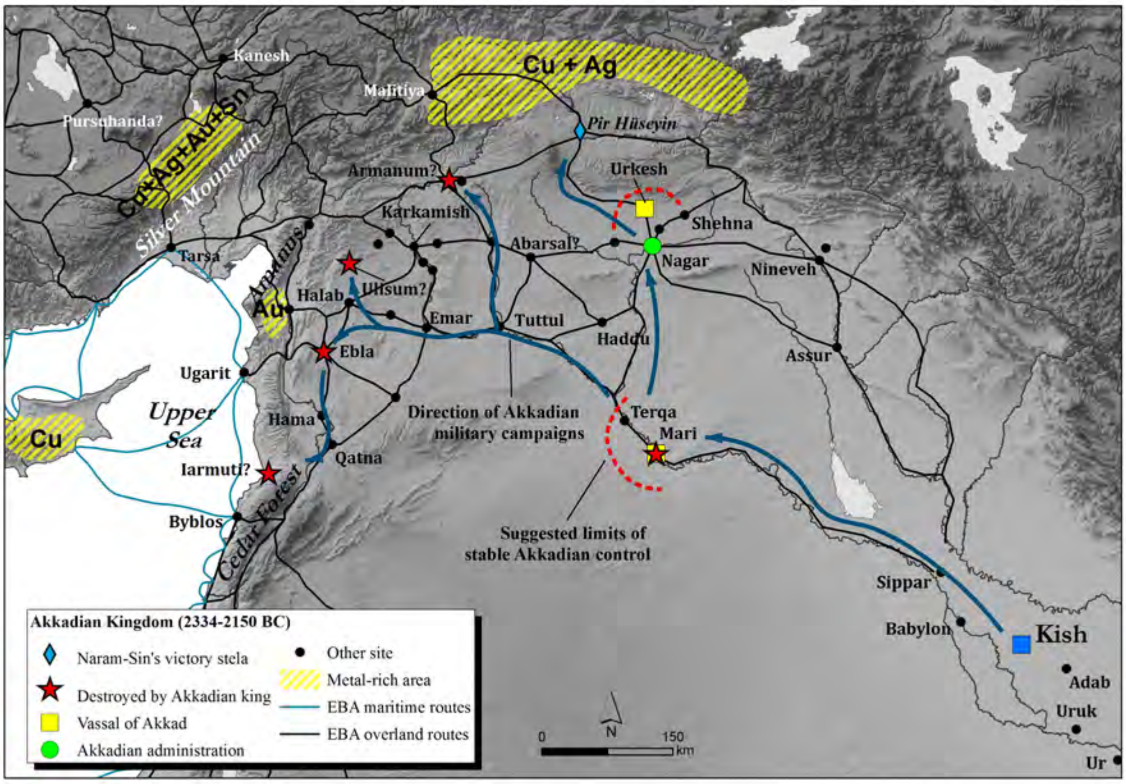

Figure 8.26. Map showing the direction of the military campaigns of the Akkadian kings Sargon and Naram-Sin into north-western Syria (at c.2330 and 2220 BC), and the limits of direct or indirect (through vassalage) control of the area, as reconstructed from fragmentary texts and archaeological evidence (cf. Archi 2011, 2013). Note that the maximum reach of the Akkadian armies (marked by the destruction of Ebla, Iarmuti, Ulisum and Armanum, and the victory stela of Naram-Sin at Pir Hüseyin) seems to aim at obtaining control over the major routes accessing the central and eastern Anatolian metal deposits.

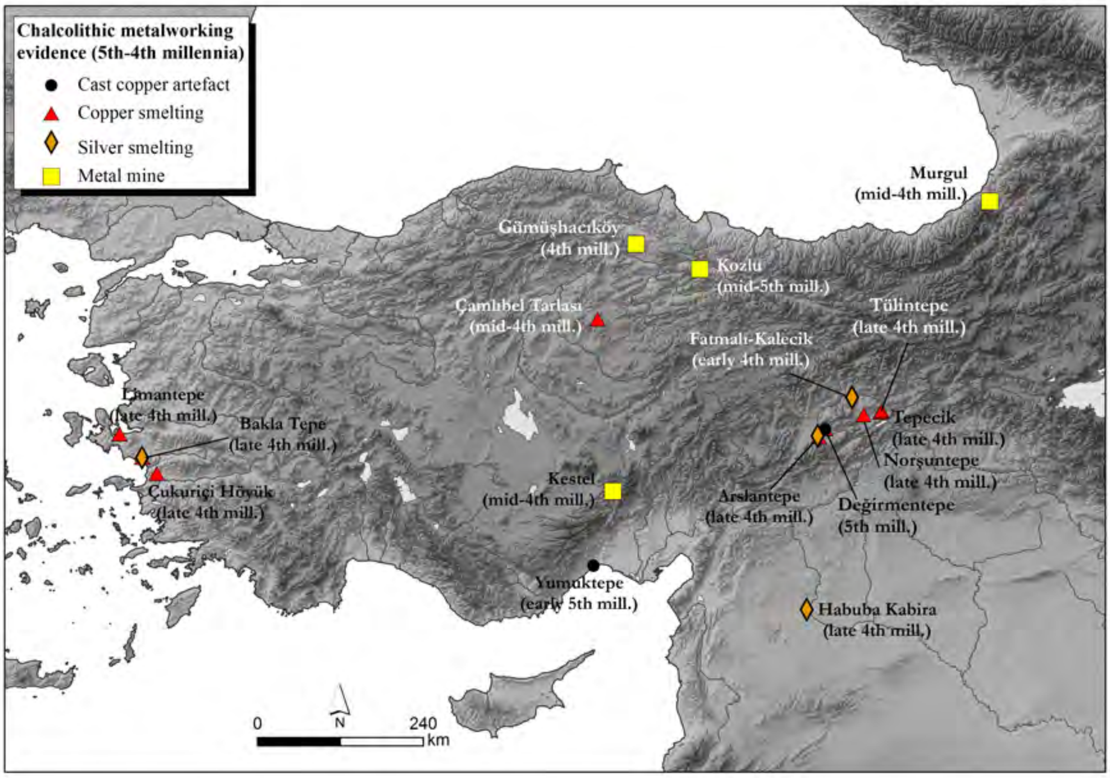

Figure 8.27. Map showing the location of early (5th-4th millennia BC) evidence for metalworking in Anatolia, in the form of cast copper objects (only 5th millennium), mines, and silver/copper smelting.

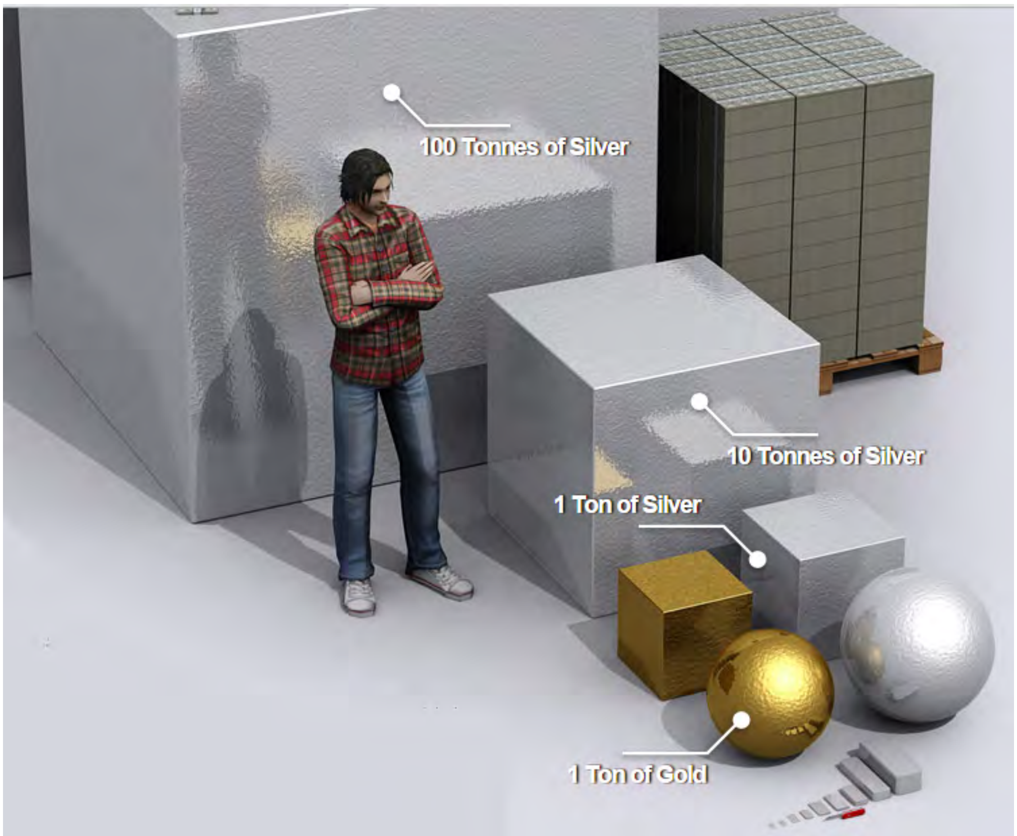

Figure 8.28. Visual representation of the volume occupied by different quantities of gold and silver. One tonne of silver occupies a 50x50x50cm cube, one tonne of gold occupies 37x37x37cm cube. Picture from: http://demonocracy.info/infographics/world/silver/silver.html [last accessed 01/07/2015].

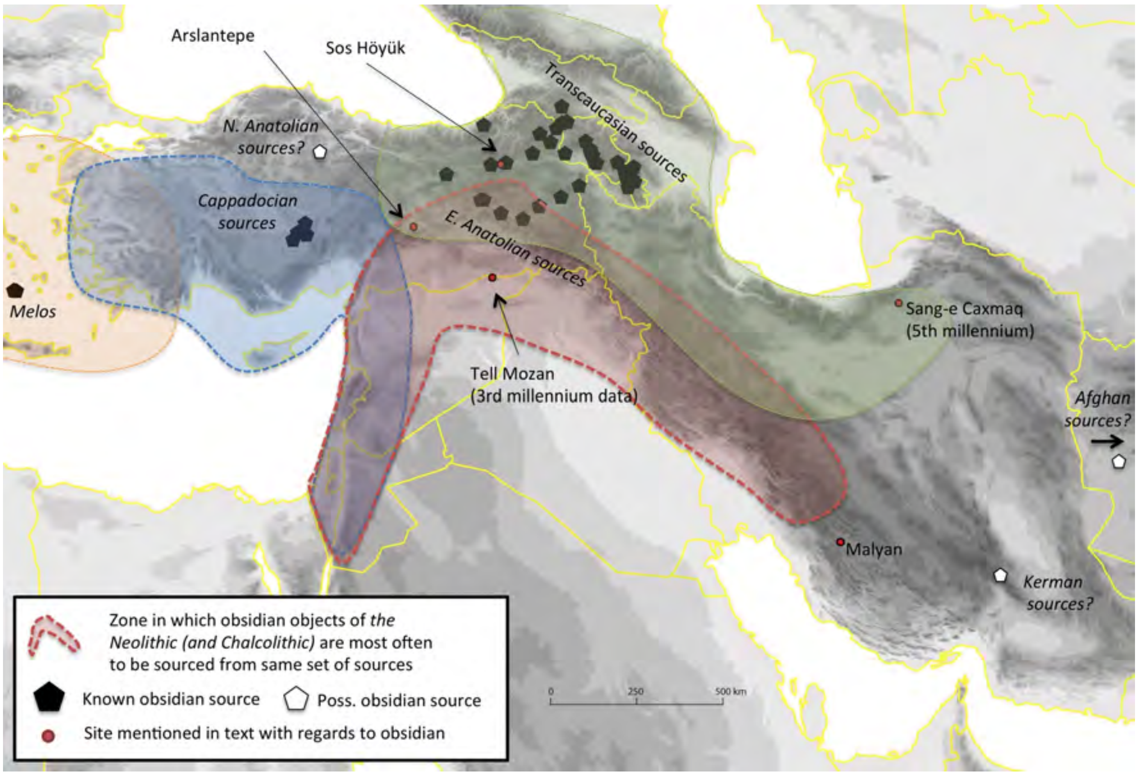

Figure 8.29. Map showing the extent of Neolithic and Chalcolithic obsidian networks (Wilkinson 2014a: fig.4.9).

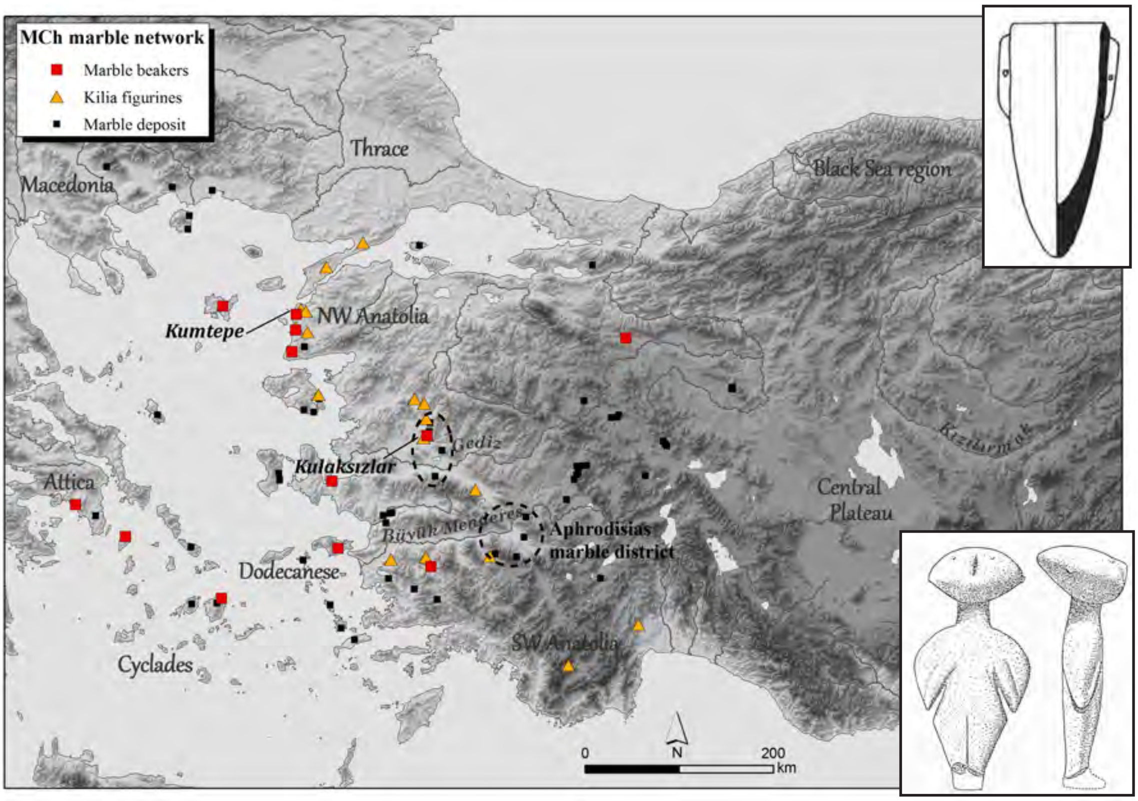

Figure 8.30. Map showing the distribution of Middle Chalcolithic (5th millennium BC) marble Kilia figurines and pointed beakers. Kulaksızlar, Kumtepe and the Aphrodisias marble district (discussed in the text) are also marked.

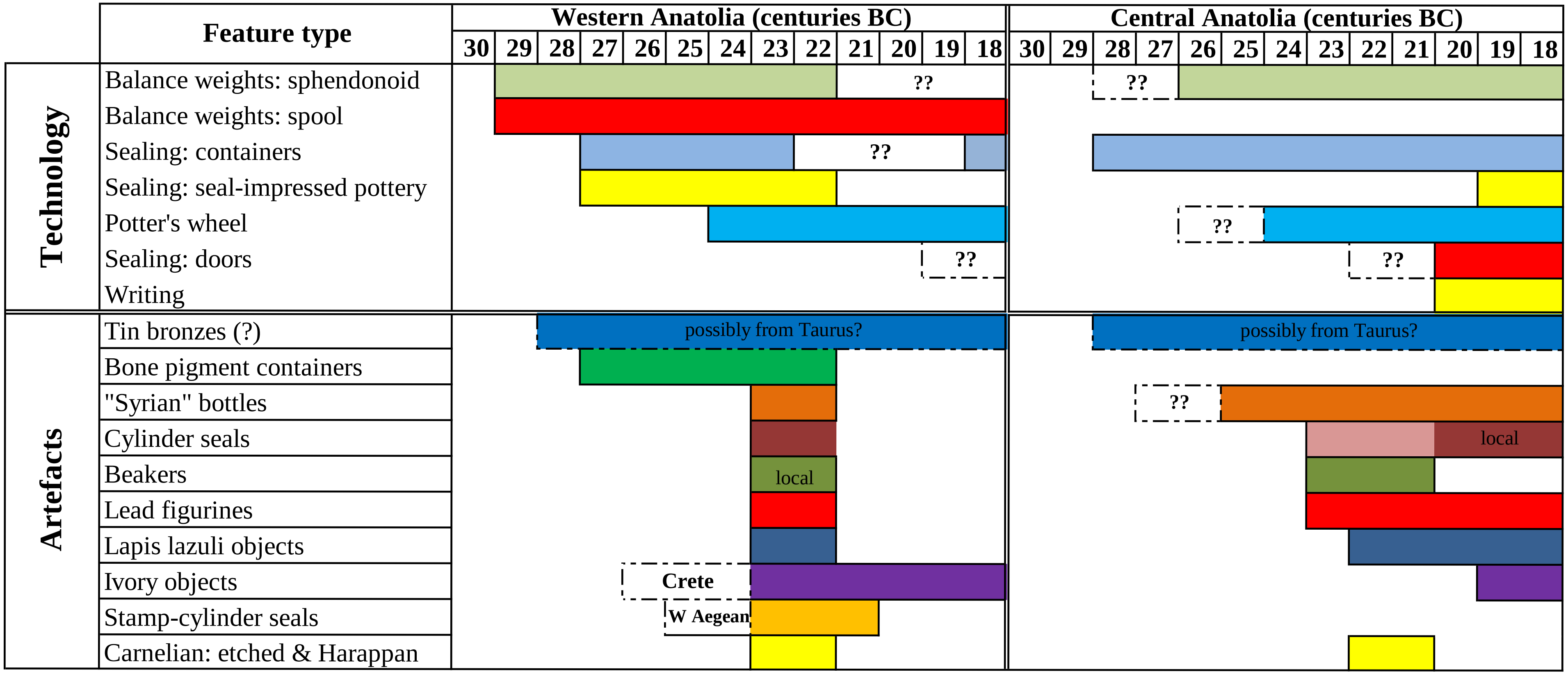

Figure 8.31. Occurrence of artefacts and technologies of supposed Levantine and Mespotamian origin in western and central Anatolia.